Forestry

The RUBBER AGE

Published TWICE-A-MONTH at New York

Vol. 27 JUNE 10, 1930 No. 5

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The use of the AGERITES *is growing.*

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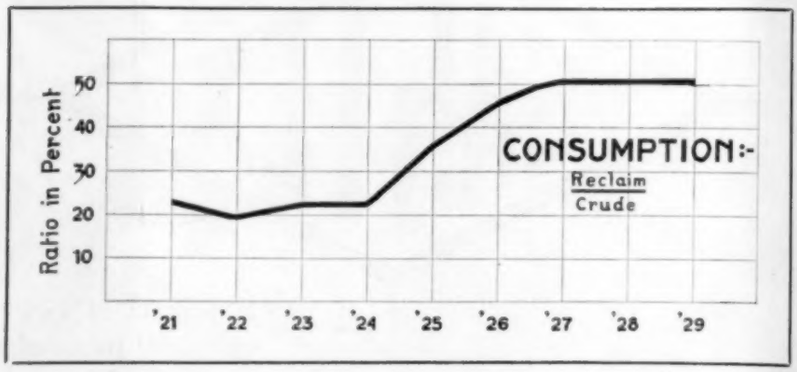
39,000 experiments in this a modern, *better* reclaim!

Increase in Use of Reclaim, Despite Falling Crude Prices, Is Explained



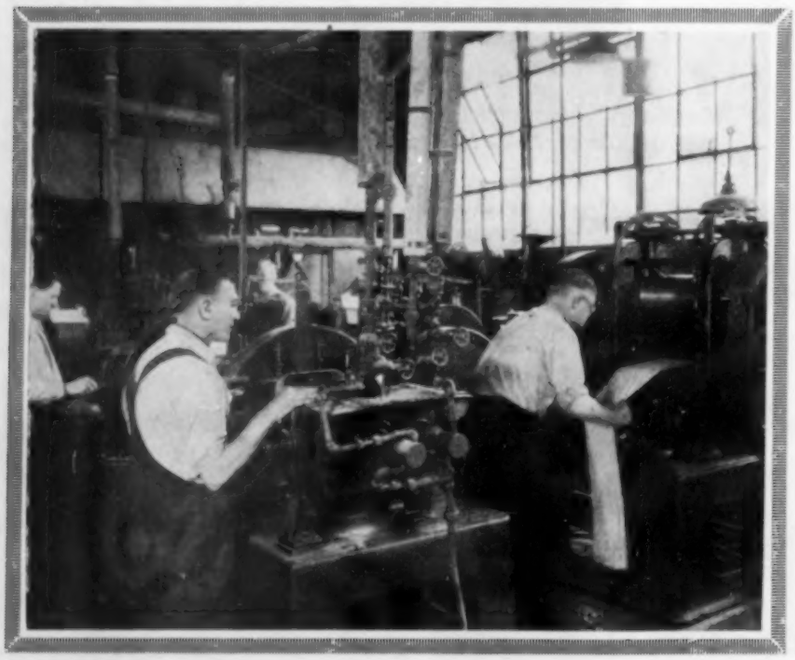
EXECUTIVES and technical men of the rubber industry, who keep up with the rapid developments in their profession, have been repeatedly impressed by the improvements in reclaim—and by its widely increasing use.

For years reclaimed rubber was regarded as only a low-cost substitute—which, in effect, it was. Now it stands out as a high-quality raw material—the *best* material for certain purposes. Its development promises to take its place along with the use of carbon-black, the development of antioxidants and organic accelerators, as one of the great contributions of science to the rubber industry. We are proud of the part we have played in this development—proud of the fact the history of reclaim is largely a history of the Philadelphia Rubber Works Company.

Reclaim, today, is a different product from the reclaim of ten years ago. Yet despite this much higher quality, prices have remained at practically the *same level.* And the use of reclaim has increased—it has actually displaced the use of crude rubber—despite the *decline in crude-rubber prices!* The chart above tells the full story of this increase—from 22 per cent to 50 per cent in ratio of reclaim to crude rubber used, over a period of ten years.

Photographs on these pages show views of the Philadelphia Rubber Works Company laboratories where the improvements were developed which made this increased use possible. Over 39,000 distinct experiments have been made.

At least two of the important results from these tests deserve special mention: (1) The development of a technical control which insures absolute uniformity. In former years the user could not be sure of *uniform* reclaim. (2) The development of new formulas and new methods of using reclaim.



Experimental mill room, Akron laboratory, showing equipment for running control tests on reclaim to insure uniformity of milling and calendering properties.

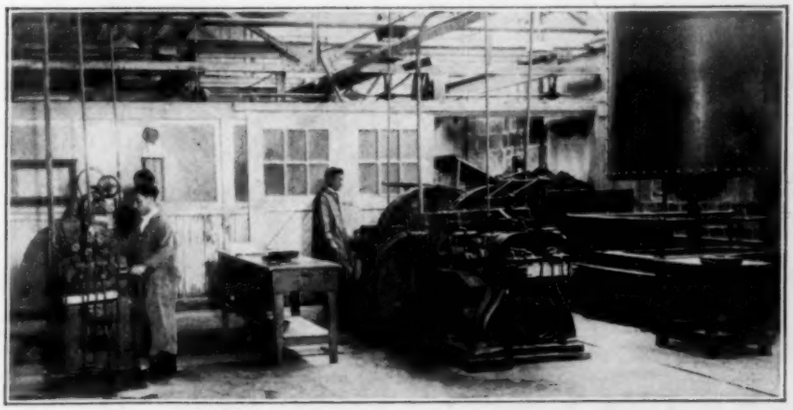
laboratory have created

A section of the Philadelphia chemical laboratory at the Akron plant, where a large part of the 39,000 experiments mentioned above were made.

The mass of data and valuable information resulting from these experiments is now available to users. Special research is gladly undertaken when necesary and practicable.

Have you a problem—of reducing costs, improving product, or adapting your process to the use of reclaim? We invite you to write us.

The Philadelphia Rubber Works Company, Akron, Ohio. New York: 52 Vanderbilt Ave., European Agents: Wm. Somerville Sons Rubber Co., Ltd., Aldwych House, London, Eng. Works and laboratories at Akron, Ohio, and Oaks, Pa.



A part of the laboratory in plant at Oaks, Penna. Both Akron and Oaks plants have complete laboratory equipment, each manned by a staff of specialists in reclaiming.

PHILADELPHIA
Reclaimed Rubber

The RUBBER AGE

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Pigments in Compounding

THE use of pigments in rubber compounding and the problems arising from their use have always proved subjects of concern to the manufacturing industry. In a paper recently delivered before the Chicago Group of the Rubber Division, A. C. S., Harlan A. Depew went into considerable detail as to the behavior of pigments during mixing and curing. The paper was of sufficient importance to justify its publication and it has therefore been made the subject of a feature article in this issue. A paper by the same author touching another phase of this subject and entitled "The Mechanism of the Reinforcement of Rubber by Pigments" was carried in THE RUBBER AGE of January 10, 1929.

NEW YORK, JUNE 10, 1930

REMARKABLE RESULTS OBTAINED WITH NEW "ZENITH" RECLAIM

First Time a Reclaimed Rubber Has Ever Been Produced With Such Strength

TENSILE OVER 2400 LBS.

Of Special Interest to Mfrs. of Tires, Tubes and High Grade Mechanicals

SPLENDID AGING QUALITY

New Reclaim Offers Unlimited Possibilities in the Field of Rubber Compounding

Special to THE RUBBER AGE

BUFFALO, N. Y., June 10.—An item of important news to the industry is the announcement here today by the Laboratories of the U. S. Rubber Reclaiming Co., Inc., whose executive offices are located at 230 Park Avenue, New York City, of their placing on the market after exhaustive development work, an entirely new and distinctive grade of Reclaimed Rubber. This new product has been most appropriately named ZENITH.

For the first time in history, the industry has available a stock of such wide potentialities in the compounding of high quality rubber goods.

This new reclaimed has been tried out in typical formulae for tire treads, inner tubes and mechanical goods with most unusual results.

In a characteristic tube compound—equal parts ZENITH and crude rubber—the stress-strain curves, modulus and tear resistance is astonishing. Tensiles of over 3700 lbs. are obtained, and elongations of over 700%.

From every compounding viewpoint, ZENITH sets a new standard in the reclaiming art.

BLE

The Better Anti-Oxidant

OXIDATION—Tests, after oxygen bomb ageing, of stocks containing BLE show clearly the very great resistance to deterioration by oxidation imparted to rubber by this chemical.

HEAT—Tests, after ageing in the air pressure bomb at high temperatures, indicate how admirably BLE is suited for use in auto tubes and products of which similar service is required.

FLEXING—Tests, on various flexing machines, of both carcass and tread type stocks bring out the great value of BLE in improving the resistance to breakdown due to fatigue flexing.

FACTORY PROCESSING—It has been found in the many plants where BLE is used that it has a remarkable effect in improving running conditions — milling, calendering and tubing. This makes for reduced operating costs and happier workmen.

COST AND QUALITY—The cost is low. The quality is high.

What more could anyone ask?

The Naugatuck Chemical Company

1790 BROADWAY NEW YORK CITY

The RUBBER AGE

VOL. 27, NO. 5 JUNE 10, 1930

LATE NEWS of the Industry

Firestone Tire & Rubber Company Has Profits of $2,320,118 in Six Months

NET profits of the Firestone Tire & Rubber Company and all subsidiaries for the six months ended April 30, 1930, after deducting depreciations, interest, federal taxes and all other charges, including Liberian development expenditures, was $2,320,118. Harvey S. Firestone, president, stated that the rubber industry is just entering the summer buying season and that the company's dealers expect heavy tire buying by the public, which would make the outlook very favorable for the next six months.

This net income for six months was equivalent after dividend requirements on 600,000 shares of 6 per cent preferred stock to 23 cents a share (par $10) on the 2,239,860 shares of common stock outstanding. Although not sufficient to meet the dividends which are now being paid on the common at the annual rate of $1.60 a share, these earnings in the six months immediately after the stock market deflation and during a period of sharp business recession are regarded as promising an impressive showing at the end of the company's fiscal year.

The company's sales total for the period was not revealed in the report. Inasmuch as the company has not in prior years issued semi-annual statements, there are no comparative figures for the corresponding period in 1928-1929. During the full year ended October 31, 1929, the company earned $7,726,870 after similar deductions. In connection with the issuance of its 600,000 shares of new preferred stock last fall, it was announced that the company had earned $6,016,527 in the ten months ended August 31, 1929.

The Firestone Tire & Rubber Company has continued to expand this year through the completion of its new storage battery plant, through adding brake lining to its products and through extending further the number of one-stop service stations in which it has a financial interest. Reports that the company would enter the wholesale gasoline field have been denied, although it does distribute gasoline like an oil company in two cities, one in West Virginia and one in North Carolina. In each of these cases, the company into which Firestone bought was a gasoline and oil distributing company with a set-up for selling tires and other automobile needs. The total number of service stations in which Firestone is now financially interested is understood to be between 300 and 400.

The Firestone common and preferred issues have been selling on the New York Stock Exchange recently at prices under their 1929 lows. The closing price for the common on June 2 was 23⅞ as compared with its 1930 high of 33⅛ and with the peak 1929 price of 309 for the old common stock, equivalent to about 62 for the new common. The preferred closed on the same day at 78⅝, as against its 1930 high of 87⅞ and its 1929 peak of 98¾ when first issued.

Crude Rubber Price Quotations Drop Near the Lowest Levels Ever Recorded

WITH actual rubber selling on the New York outside market at 13 cents a pound and on the London market at 5 15/16d. the commodity on June 5 approached the record low level for the entire history of its development. The current level, however, is above that of June, 1921, when the price sank to 11½ cents a pound.

Prices on the Rubber Exchange of New York also broke through their previous low records, with July rubber selling down to 13.10 cents a pound on June 4 and 12.70 cents a pound on June 5. The certificated rubber on the No. 1 Standard Contract sold at a low of 12.95 cents for the July delivery on June 5. On the same day, however, bear interests who were selling the futures freely for two days, covered on a report from London which indicated that rubber producers were definitely taking measures to extend the restriction plan, and the commodity rallied from 20 to 40 points.

The selling had been based on a weakening in the position of the foreign markets and speculative selling at London following a larger export total report on Malayan crude shipments during May than had generally been expected considering that production had been suspended during that month under the restriction plan. Malayan exports were reported as 49,039 tons, as against 43,813 tons during April and 43,960 tons during May, 1929. The Malayan shipments last month were the largest since January when the figure reached 52,535 tons.

Whether any further restrictive measures will be initiated by the producing interests is still uncertain, pending definite knowledge as to the effects of the May tapping holiday. The most expected from the May stoppage is a

cut of about 30,000 tons, but far greater interest is being shown in the possibilities for future Anglo-Dutch co-operation which may follow.

"If, by the middle of August, there is still no sign of recovery," says the London firm of Faulkner & Winsor, rubber brokers, "stocks will again begin to increase and prices may fall to hitherto unheard of levels. It will be then that the already initiated co-operation between the Dutch and British producers will be offered its real opportunity of bearing fruit."

Lee Rubber & Tire Corporation Shows Net Loss of $64,614 for Six Months

THE Lee Rubber & Tire Corporation, which has been during the past few years one of the most consistent profit makers among the smaller companies, has reported for the six months ended April 30, 1930, a net loss of $64,614 after depreciation and charges. This compares with net profit in the six months ended April 30, 1929, of $227,270, equal to 76 cents a share on 300,000 no-par shares of stock.

Net sales for the period dropped to $4,211,461, as compared with $4,868,479 in the corresponding period a year ago and with $5,244,722 in the six months to April 30, 1928. In the current year, the company reports an operating loss of $57,664 and interest charges of $57,975. Other income, however, amounted to $51,025, thus bringing the net loss to the figure of $64,614.

Lee showed a marked improvement in 1929 after equipping its plants at Conshohocken, Pa., and Youngstown, O., with thoroughly modern machinery. Several important contracts were negotiated last year, including a three-year agreement with the Pennsylvania-Ohio Power & Light Company for about $500,000 worth of tires and tubes and a distributing agreement with the Warner-Quinlan service station chain. The company's tire and tube business accounts for about three-quarters of its entire business, the remaining one-quarter being the manufacture of mechanical rubber goods at the Youngstown factory of its subsidiary, the Republic Rubber Company. In the full year ended October 31, 1929, the company earned $485,930, or $1.61 a share.

Early this year, John J. Watson, president, declared, "There has been some falling off in the demand for tires during the last few months which has affected the volume of sales, but as the company does practically no manufacturers' equipment business, the tire sales being largely confined to the renewal and replacement field, the company should not be seriously affected."

The market for the common stock of the Lee Rubber & Tire Corporation this year has fluctuated between 6¼ and 11 and current quotations on the New York Stock Exchange are in the neighborhood of 7½. During 1929, the stock dropped from a high of 25 to a low of 5 in the October-November crash.

The consolidation income account for the six months ended April 30, 1930, compares with the corresponding periods of the past two years as follows:

	1930	1929	1928
Net sales	$4,211,461	$4,868,479	$5,244,722
Expenses, depreciation, etc.	4,269,125	4,630,934	*5,158,512
Operating loss	$57,664	†$237,545	†$86,210
Other income	51,025	50,075	68,429
Loss	$6,639	†$287,620	†$154,639
Interest	57,975	60,350	63,491
Net loss	$64,614	†$227,270	†$91,148

*Includes reserve for rebates. †Profit.

Work on Goodyear Argentine Factory Is Scheduled to Start on July First

THE decision of the Goodyear Tire & Rubber Company to erect a modern tire factory near Buenos Aires, Argentina, upon the site to which it has held title for some time, was announced on May 28 by P. W. Litchfield, president and chairman of the board.

Construction of the plant, a one story building 250 by 460 feet, will start July first. There will be in addition a boiler room, 40x89 feet; engineering building, 60x66 feet, and switch board room, 15x66.

The factory, to be known as the Goodyear Tire & Rubber Co. of Argentina, is located in Hurlinghame, a suburb of Buenos Aires, situated 16 miles northwest of the city, up the La Plata River.

Capacity of the new South American plant, which will be turning out tires by February 1, will be a thousand tires and a thousand tubes per day. Payroll of the factory is expected to include 400 employees, Mr. Litchfield said.

Fred W. Climer, for many years manager of the factory personnel department of Goodyear in Akron, will leave shortly for Buenos Aires, where he will be superintendent of the new plant. C. R. Bollinger of Akron has been appointed comptroller and H. Sivaslian will be in charge of the construction work.

The South American factory will be the fifth foreign Goodyear plant — the others being located as follows: Canada, two; England and Australia, each one. It will also be the ninth Goodyear tire factory, four others being located in the United States. The company also operates its own tire fabric mills at seven points in North America; cotton plantations in Arizona, and rubber plantations in Sumatra and the Philippines.

Firestone and Seiberling Criticise Pending Hawley-Smoot Tariff Measure

BOTH Harvey S. Firestone, president of the Firestone Tire & Rubber Company, and Frank A. Seiberling, president of the Seiberling Rubber Company, expressed decided disapproval of the pending Hawley-Smoot tariff during the past fortnight, attacking particularly the proposed seven-cent duty on long staple cotton and pointing out the danger of reprisals against all American exports. Mr. Seiberling declared that the "Grundyized" bill goes beyond the concepts of protection and becomes restrictive, while Mr. Firestone denounced the whole "tariff folly" as "ridiculous."

"Take Switzerland for instance," said Mr. Firestone. "Our representatives there are alarmed at the situation which has developed. Because of the high rate imposed against Swiss watches, a general boycott against all American goods is being talked. It is the sort of thing we may expect from nations that are our best customers."

Mr. Firestone assailed the proposed seven-cent rate against Egyptian long-staple cotton.

"Where we buy 300,000 bales of this cotton, which can not be grown in the United States, this nation exports 8,000,000 bales of American-grown cotton," he said. "England has spent untold thousands of dollars developing cotton, and could ask no better excuse to impose a rate in reprisal against us.

"Think of the effect of even 1 or 2 cents a pound. It can't help the cotton-grower, and can only harm him."

Mr. Firestone said that regardless of price, there is no substitute for Egyptian cotton in the thread industry, that it must be used for heavy duty truck and passenger car tires and in de luxe grade.

"The tariff will fail wholly in its purpose," he said, "for

it can not increase consumption of American-grown cotton.

"The tire industry can absorb the blow, of course, but it will only pass the increased cost along to the customer. Millions of customers will pay for the tariff folly."

"I believe thoroughly in the principle of a protective tariff," says Mr. Seiberling. The Hawley-Smoot tariff bill goes beyond the point of protection to that of restriction upon American business, and should be defeated.

"This bill ignores the fact that the country is no longer in the red in its international commerce. Its mass production makes it secure in its domestic markets, but its industries must have the protection of amicable trade relations abroad to protect their expansion. This bill already has elicited reprisals and will bring more in the early future.

"With respect to the rubber industry, the proposed seven-cent duty on long staple cotton will place the American manufacturer at a competitive disadvantage with the foreign manufacturer who pays no such import, and will increase the cost of rubber goods in the domestic market.

"Our tariffs should carry no higher than the point of adequate protection, avoiding thereby the reprisals that will seriously affect our foreign trade and friendly relations with foreign countries."

May Rubber Consumption Figured at Over 44,000 Tons by Exchange Members

SALES of finished tires during the past month justified a slight increase in operations at tire factories and a corresponding gain in consumption of crude rubber. Members of the Rubber Exchange of New York estimate that crude consumption for May totaled between 44,000 and 45,000 long tons, as compared with 40,207 tons used in April.

This would bring rubber consumption in the United States for the first five months to 190,016 tons, compared with 226,080 tons during the same period last year, reduced operations which have already been reflected in a material decline in tire inventories.

Rubber consumption during May last year totaled 49,233 long tons, the record monthly figure for the industry.

Fisk to Support Independent Dealers; Announces Gain in Bus Contract Sales

DECLARING that it has always been the policy of his concern to deal with independent merchants of high character, President Harry T. Dunn of the Fisk Rubber Company, Chicopee Falls, Mass., has announced the company policy definitely in an open letter addressed to independent merchants throughout the country which appeared in a recent issue of trade and general magazines.

The letter stated that the company policy had not changed and that Fisk would continue to support the independent merchant. Speaking of factory-controlled stores, the Fisk president said: "Since the advent of the factory-controlled store, we are often approached to deviate from our established policy of doing business with the independent merchant. At this time, I wish to emphasize that our policy is unchanged. We have chosen our merchants for their integrity and ability to offer the public unfailing service—to honorably reflect the excellence of our products. Their success and ours are united."

"We are, as quickly as possible, disposing of 26 experimental retail establishments which we opened in various communities where no dealer of Fisk qualifications was at the time available," continued Mr. Dunn. "These will be placed in the hands of capable, independent merchants. We believe in the independent. We believe our merchants are the finest tire merchants obtainable. To them we pledge our support."

A new policy of selling to national accounts has been adopted and henceforth the company will solicit and service this market through its dealer organization. Previously this business has been sought direct from headquarters.

According to a recent survey released by N. B. Brodhead, manager of the commercial tire department, volume of sales on bus contracts has more than doubled in the last seven months.

It was stated by Mr. Brodhead that the increase in mileage business was a result of contracts signed with some of the largest bus accounts in the country such as the Peoples Motor Bus Corporation of St. Louis; the Baltimore Motor Coach Company, Baltimore; Boston Elevated Railways, Boston; Boston & Maine Transportation Company, Boston, and other large transportation companies throughout the United States.

Goodyear Leads in Tire Price Cuts With 5% Reduction on Regular Line

ALL the leading tire manufacturing companies were expected to announce reductions in the prices of their products following the lead of the Goodyear Tire & Rubber Company on June 5 in setting lower prices on some but not all lines.

The major reduction by Goodyear was on its 4-ply passenger car lines known as its "regular" line, on which the price is dropped about 5 per cent. Tubes were reduced by the same percentage.

Reductions were slight on the heavy duty passenger car tires while prices on its premier product, the Double Eagle, apparently have been maintained.

Prices for the Pathfinder line known as its second grade have been increased on some sizes.

The cuts were attributed by P. W. Litchfield, Goodyear president, to improved manufacturing methods and lower material costs, who said that the new prices were the lowest in the history of the industry. They follow close upon the price reductions announced by Sears, Roebuck & Company and Montgomery Ward & Company, leading mail order houses, in their mid-summer catalogs. These companies cut tire prices from 4 to 6 per cent on all sizes and types.

Automotive Parts and Accessory Trade Showed Marked Improvement During April

APRIL proved to be a very satisfactory month for manufacturers in the automotive parts-accessory industry, business showing a marked gain over March. There has been no evidence of curtailment of operations so far this month and May will quite possibly register a slight increase over April according to the Motor and Equipment Association, composed of more than 500 automotive parts, accessory and equipment manufacturers and wholesalers.

Increased business was enjoyed by both the suppliers of units, parts and accessories to the car and truck manufacturers for original equipment and of parts, accessories and garage repair equipment to the trade. The business of member wholesalers in the Association also forged ahead.

There has been a consistent gain in the parts industry since the first of the year, from the low levels reached in the closing months of 1929. Operations are, of course, still running below the same period last year.

The grand index of shipments for all groups of manufacturer members reporting their figures to the Association in April stood at 163% of the January, 1925, base index of 100 as compared with 155 in March, 136 in February and 254 in April a year ago.

Other news of the industry will be found on Pages 259-265

Rubber Industry Reflects Improvement in Business

Activity in Almost Every Branch Shows Slight Gains in Rate of Production Over Previous Quarter but Shipments Still Lag Behind

BASED on data more complete than heretofore available, the Rubber Manufacturers Association, Inc., has issued revised estimates covering the industry's statistical position for the first quarter of the year.

Sales of manufactured rubber products for the first quarter of 1930 amounted to approximately $218,315,000, a decrease of 6.6% under the fourth quarter of 1929 and 20.3% under the first quarter last year.

Consumption of crude rubber for the first quarter of 1930 is estimated at 101,610 long tons, an increase of 19.7% over the fourth quarter of 1929, but 20.9% under the unusually active first quarter of 1929.

Stocks of crude rubber on hand in the United States on March 31 amounted to 144,642 long tons, an increase of 33.3% over December 31, 1929, and 44.5% over March 31 a year ago. In this connection, it is interesting to note that reasonably reliable reports from the Middle East indicate a reduction of about 30,000 tons in the probable world's production of crude rubber during 1930 due to the so-called May tapping holiday.

"While the price of crude rubber has been fairly stable for some time past at a comparatively low level for the commodity," the Association states, "the spot price quotations appearing in the daily press do not reflect the actual cost of rubber being consumed by tire and other rubber goods manufacturers because the greater part of the total tonnage necessarily is bought on futures, which are almost invariably higher than the spot prices. Manufacturers generally anticipate their rubber requirements months in advance as a protection to the public and themselves against any undue fluctuation in market levels and to assure a steady supply of raw material.

"In addition, the published spot prices do not reflect the actual cost to the manufacturer because both spot and future prices for actual deliveries of physical rubber are invariably higher than those covering speculative transactions in connection with which deliveries are seldom consummated. Furthermore, the published prices are not truly representative of the cost of the higher grades of rubber. For example, fine para is quoted at approximately 15 cents, but due to a weight shrinkage of almost 20%, the net cost to the manufacturer for this grade of rubber is about 18 cents a pound."

The figures presented in the table below are estimated by the Rubber Manufacturers Association to represent 92% of the American manufacturing industry, but those quoted in this article have been raised so as to represent 100% of the domestic industry.

Comparative Table of Value of Rubber Goods Shipments from Manufacturing Plants and the Amount of Crude Rubber Consumed for the Last Five Quarters

Total Sales Value of Manufactured Rubber Products Shipped

Thousands (,000) omitted.

	Product	1Q-30	4Q-29	3Q-29	2Q-29	1Q-29
	Tires and Tire Sundries					
1	Auto and Truck Casings	$105,939	102,267	169,903	165,571	141,240
2	Auto and Truck Tubes	15,619	14,758	23,604	24,011	20,558
3	Motorcycle Casings and Tubes	243	199	405	426	318
4	Bicycle Casings and Tubes	534	631	877	785	b584
5	Aeroplane Casings and Tubes	83	63	100	144	147
6	Solid and Cushion Tires	2,374	3,149	4,752	5,049	4,253
7	All other Solid Tires	335	320	721	747	577
8	Tire Sundries and Repair Materials	3,712	3,614	4,737	4,141	4,376
TOTAL	—Tires and Tire Sundries	$128,839	125,001	205,099	200,874	172,053
	Other Rubber Products					
9	Mechanical Rubber Goods	$ 24,149	23,200	28,234	30,926	28,835
10	Boots and Shoes	20,148	36,301	31,266	22,303	20,986
11	Insulated Wire and Insulating Compounds	7,089	8,230	8,963	7,734	8,199
12	Druggist Sundries, Medical and Surgical Rubber Goods	1,626	1,545	2,409	1,957	2,230
13	Stationers' Rubber Goods	585	601	631	646	682
14	Bathing Apparel	709	234	503	1,597	653
15	Rubber Clothing	1,083	2,610	2,696	1,868	1,362
16	Automobile Fabrics	2,230	1,892	3,267	3,021	2,477
17	Other Rubberized Fabrics	1,506	2,904	2,751	2,099	1,739
18	Hard Rubber Goods	1,257	1,679	1,889	1,640	1,587
19	Heels and Soles	5,945	5,792	6,298	5,895	5,774
20	Rubber Flooring	1,029	1,189	1,366	1,137	892
21	Sporting Goods, Toys and Novelties	1,793	1,356	2,002	2,676	1,578
22	Miscellaneous, not included in any of above Items	2,862	2,482	2,815	3,461	3,109
TOTAL	—Other Rubber Products	$ 72,011	90,015	95,090	86,960	80,073
GRAND TOTAL	—All Products	$200,850	215,016	300,189	287,834	252,126

Crude Rubber Consumed—Long Tons

	Product	1Q-30	4Q-29	3Q-29	2Q-29	1Q-29
	Tires and Tire Sundries					
1	Auto and Truck Casings	61,642	48,244	69,220	89,261	82,393
2	Auto and Truck Tubes	12,384	10,096	13,813	17,038	15,736
3	Motorcycle Casings and Tubes	96	47	61	87	64
4	Bicycle Casings and Tubes	345	401	349	279	248
5	Aeroplane Casings and Tubes	15	25	66	60	27
6	Solid and Cushion Tires	1,577	1,873	2,175	2,733	2,209
7	All other Solid Tires	72	106	224	293	182
8	Tire Sundries and Repair Materials	1,149	792	1,152	1,317	1,232
TOTAL	—Tires and Tire Sundries	77,280	61,584	87,060	111,068	102,091
	Other Rubber Products					
9	Mechanical Rubber Goods	4,628	4,692	5,785	6,022	5,783
10	Boots and Shoes	4,944	5,534	4,873	4,740	3,827
11	Insulated Wire and Insulating Compounds	999	1,050	976	717	1,071
12	Druggists' Sundries, Medical and Surgical Rubber Goods	318	469	545	487	537
13	Stationers' Rubber Goods	386	280	316	375	355
14	Bathing Apparel	254	155	103	223	284
15	Rubber Clothing	312	356	471	369	282
16	Automobile Fabrics	231	252	342	365	318
17	Other Rubberized Fabrics	471	681	709	512	452
18	Hard Rubber Goods	279	236	381	317	339
19	Heels and Soles	1,952	1,677	1,635	1,471	1,535
20	Rubber Flooring	261	282	285	298	257
21	Sporting Goods, Toys and Novelties	511	362	344	430	429
22	Miscellaneous, not included in any of above Items	655	472	821	755	719
TOTAL	—Other Rubber Products	16,201	16,498	17,586	17,081	16,189
GRAND TOTAL	—All Products	93,481	78,082	104,646	128,149	118,280

What the SOVIET RUBBER INDUSTRY *is* Doing

Profits Are Estimated at $30,000,000—Complete Centralization the Aim of the Industry—Production of Rubber Footwear Amounts to 42,820,000 Pairs

By HARRY W. NEWMAN
U. S. Department of Commerce

THE rubber industry of Soviet Russia, which was organized in 1922, has proved the most gainful of all the activities sponsored by the State, with profits multiplying each year. The net profits for the fiscal year ended September 31, 1929, are estimated at $30,000,000, a substantial increase over the $9,800,000 declared profits of two years ago. Inasmuch as the State enjoys a complete monopoly, the profits are approximately 30 per cent of the annual turnover.

Production of rubber goods now exceeds that of the period preceding the World War by approximately 132 per cent, whereas exports during 1928-29 for the first time surpassed the normal pre-war year 1913. Before the war the principal rubber article produced was footwear which reached an output of 27,885,000 pairs in 1913. In that year rubber-footwear exports reached 3,396,800 pounds, valued at $1,462,000. Other exports of rubber manufactures aggregated 4,791,900 pounds, valued at $1,465,250. Russia's best markets in those days for rubber goods were Germany, Great Britain, Belgium and Turkey.

Present Consumption Exceeds Pre-War Years

The present internal consumption of rubber goods has increased at a great pace and now surpasses that of the pre-war years, especially in rubber footwear. Besides the Government is experimenting with the production of crude rubber with hopes that the country will ultimately be independent to a certain degree in this field.

Soviet Russia took steps to recuperate its paralyzed rubber industry by a resolution issued by the Presidium of the Supreme Economic Council in 1922, using the idle plants of the former Empire. Like all Soviet enterprises, the industry was operated and administered directly by the State under the Council through the Resinotrest or Rubber Trust.

The largest of the Soviet factories is the Krasni Treugolnik (Red Triangle) which utilizes the Petrograd and Moscow works of the old Treugolnik company. It employs at present some 20,000 men and women, and accounts for about 70 per cent of the total Soviet production. The Krasni Bogatyr (Red Giant) uses the former Bogatyr plants at Moscow and now maintains a working force of 6,500, producing approximately 20 per cent of the total production. The Krasni Kautchuk of Moscow is installed in the former "Caoutchouc" establishment with 1,500 employees, while a small plant with about 800 laborers prepares the crude material for fabrication into the finished soft and hard-rubber products.

Steps Toward Centralization

The ultimate plan of the Soviet rubber industry is complete centralization, although under present conditions it has not been expedient to carry out the scheme in its entirety. The method of the Resinotrest is to have each factory specialize in the manufacture of certain articles and therefore eliminate unnecessary duplication of machinery, transportation and distribution. At present the matter of distributing production presents a difficult task, for the rubber factories of the Empire were constructed to manufacture a number of rubber articles and it would be uneconomic to move the old machinery from one factory to another. It is believed that as the machinery becomes obsolete, the replacement can be concentrated in one plant and thus consummate the Soviet system of industrial management.

Krasny Treugolnik (Red Triangle) Rubber Shoe Factory in Leningrad

The progress in modernizing the production methods, however, has been considerable in the past couple of years. Most of the processes were formerly carried out by hand methods, but now labor saving devices are being utilized to an increasing extent. The workers are being organized into groups in which complete division of labor has been established, while conveyor systems have been introduced in a number of the departments.

Russian rubber experts have been interested in the United States rubber industry and early in 1927 a number of commissions were sent to this country to make a study of the prevailing industrial conditions. As a result considerable machinery of the

American type has been installed and American production methods have been incorporated into the present Soviet industry.

Increased Consumption of Rubber Footwear

Since 1913 the population of Soviet Russia has increased approximately 8 per cent, and the demand for rubber shoes is estimated at 25 per cent more than pre-war, or one pair for every four inhabitants. A marked revival of the footwear industry began in 1922, when almost 4,000,000 pairs of galoshes were sold by the Soviet factories. Sales have been steadily increasing since that year and at the end of 1925 the demand had increased to such an extent that there was a serious shortage.

The peasants are wearing rubber footwear more than ever for ordinary wear, using them for street shoes as well as house slippers. Parallel with the increased demand of the peasantry is a growth in urban centers. People who never before wore overshoes are now purchasing them as part of their necessary wardrobe. Before the Soviet regime people in the winter wore felt boots and used galoshes only during rainy weather. Now they are wearing them the year round. The fact that the inhabitants are doing most of their traveling in the cities on foot increases the wear and tear on galoshes and many are purchasing two and three pairs a year.

The production of rubber footwear in 1913 amounted to 27,885,000 pairs, whereas the production for 1927 aggregated 29,634,000 pairs. In 1928 production reached 37,717,000 pairs, an increase of 22 per cent over the previous year. The output for 1929 totaled 42,820,000 pairs, the greatest in the history of the Soviet rubber industry. It is estimated that the production of footwear comprises fully 65 per cent of the industry.

Expansion of the Tire Industry

As a result of the rapid extension in the use of automobiles and autobusses, the production of rubber tires has grown in recent years. With the completion of the $22,500,000 tire and fabric establishments at Yaroslav, Soviet Russia can be looked upon as a greater potential factor in the tire industry.

Tire manufacture at other Soviet plants has already made considerable progress since 1922. The number of tires and tubes for all vehicles produced during the past fiscal year was around 900,000 units. Tires are now exported to several of the adjacent countries, but at present they have not given any formidable competition to the better known makes of other manufacturers. The production of automobile casings during the past fiscal year aggregated 210,000 units, a decrease from the 532,000 in 1927-28. The production of tires comprises about 9 per cent of the total output of the Soviet rubber industry.

The industry is constantly improving the quality of its tires. In 1924 the average distance of a tire manufactured by the Red Triangle plant was 3,000 kilometers and by 1928 it is reported to have a lasting mileage of 12,000 kilometers.

According to the latest figures, Russia has slightly more than 23,000 motor vehicles of which about one-half is in motor trucks. Pleasure and sport cars are almost unknown, for private incomes are not large enough to allow such a luxury. Such cars in the country are with few exceptions the property of the officials of the Government or of Government agencies, and of the Diplomatic Corps.

A large increase in the demand for mechanical rubber goods, including belting, hose, rubber sheets, and asbestos goods, is also anticipated in the near future. Besides a number of new lines has been recently manufactured, such as rubber thread, colored rubber, and the like.

The sale of the Soviet rubber products is made by the trust chiefly through cooperative stores. These stores sell goods of wide distribution, such as galoshes, surgical goods, rubber balls, toys, and the like. The remaining production is sold by a system of twenty commercial branch establishments of the trust. Three of them have their own retail stores. The trust has also an agency abroad, and eight representatives on various Soviet trade delegations.

Malayan Rubber Export Duty Revised

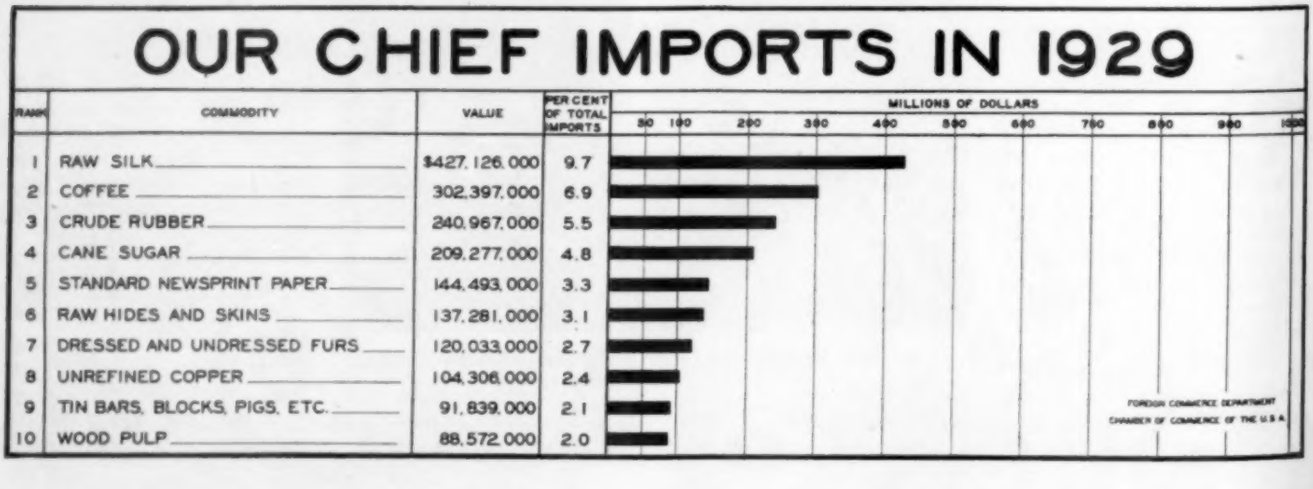
REPRESENTATIONS have been made by the Rubber Growers' Association of London to the Federated Malay states Government for revision of the present rate of export duty on rubber, and a cablegram has now been received from the association's local branch in Malaya intimating that the following new scale ad valorem export duty will be operative in the F. M. S. on and from June 1, 1930:

Price under—

30 cents	1 per cent	35 cents	2¼ per cent
32 "	1½ " "	50 "	2½ " "
33 "	1¾ " "	60 "	3 " "
34 "	2 " "	80 "	4 " "
		Over 80 "	5 " "

Provisions for latex, etc., equivalent are the same as before, 1 gallon of latex being equal to 3½ lbs. of rubber, while bark shavings from rubber trees are taken to contain 20 per cent by weight of rubber. The matter is to be considered by the Council of the R. G. A. at its next meeting.

Crude Rubber Is Third in the List of Leading Imports to the U. S.


OUR CHIEF IMPORTS IN 1929
RANK
COMMODITY
VALUE
PER CENT OF TOTAL IMPORTS
MILLIONS OF DOLLARS
50 100 200 300 400 500 600 700 800 900 1000
1 RAW SILK $427,126,000 9.7
2 COFFEE 302,397,000 6.9
3 CRUDE RUBBER 240,967,000 5.5
4 CANE SUGAR 209,277,000 4.8
5 STANDARD NEWSPRINT PAPER 144,493,000 3.3
6 RAW HIDES AND SKINS 137,281,000 3.1
7 DRESSED AND UNDRESSED FURS 120,033,000 2.7
8 UNREFINED COPPER 104,306,000 2.4
9 TIN BARS, BLOCKS, PIGS, ETC. 91,839,000 2.1
10 WOOD PULP 88,572,000 2.0
FOREIGN COMMERCE DEPARTMENT
CHAMBER OF COMMERCE OF THE U.S.A.

Toxic Substances *in the* Rubber Industry

PART XI

By **P. A. DAVIS, A.B., M.A., M.D.**

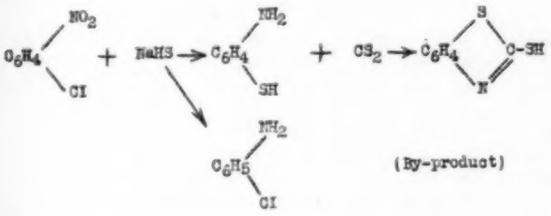
Assistant Medical Director, Goodyear Tire & Rubber Company

MERCAPTOBENZOLTHIAZOL

MERCAPTOBENZOLTHIAZOL is a synthetic product of aniline, sulphur and carbon di-sulphide and contains an amino and thio grouping.

In many cases of substances used in industry it is necessary to know how they are made in order to differentiate between the toxicity of the substance being used and the impurities present. In many cases the impurities are very toxic and the basic substance is comparatively harmless; this is the case with Mercaptobenzolthiazol.

The chemical preparation of the substances is as follows (by Teppema and Sebrell)



By studying the substances used in the reaction and the by-products formed we can very readily see that there are many possibilities for absorbed toxic substances present, especially the sulphur compounds, the chloro-benzol and nitro bodies.

The characteristic benzol grouping when combined with an amino and thio group at once suggests a toxic combination, but if the substance thus produced is an insoluble one and a solid the toxic nature of the radicals is dissipated because of the close combination and almost lack of ionic disassociation. The preparation of the sodium salt increases the solubility but not its toxicity because this close ring combination is not broken.

Mercaptobenzolthiazol is almost insoluble in water (.25 gms. in 100 gms. H_2O at 25° C) but very soluble in alcohol, chloroform, carbontetrachloride and benzol from which it crystallizes in yellow needles. The commercial product is yellow-white in powdered form, almost tasteless and odorless when purified and melts at 173° to 174° C. Recrystallized it melts at 177°-178° C. When fused at very high temperatures large quantities of volatile sulphur compounds are formed.

This substance is comparatively a new substance in the rubber industry and as it passes through the combinations with rubber its identity as such is lost. In view of the fact that it is new and that its formula is a complex one, experimental work was done to determine its toxicity. The most important methods of determing the toxicity of chemical substances is by using guinea pigs, rabbits, rats and the human system. All new substances should be tested before being used in industry and even if laboratory experiments are negative the men working with toxic substances should be examined quite frequently to see if any conditions are developing.

Our laboratory experiments were made on guinea pigs and rabbits.

A water solution was made of Mercaptobenzolthiazol (solubility .25 gms. in 100 C.C. water) and guinea pigs injected as follows:

1st day	0.5	C C of	0.0001%	Sol
3rd "	0.5	C C of	0.005%	"
5th "	0.5	C C of	0.01%	"
7th "	0.5	C C of	0.1%	"
8th "	1.0	C C of	0.1%	"
9th "	1.0	C C of	0.1%	"
10th "	1.0	C C of	0.1%	"
11th "	1.0	C C of	0.1%	"
12th "	1.0	C C of	0.1%	"
13th "	1.0	C C of	0.1%	"
14th "	1.0	C C of	0.1%	"
15th "	1.0	C C of	0.1%	"

No inoculations for 10 days then:

25th day	1.0	C C of	0.1%	Sol	intraperitoneally
26th "	1.0	C C of	0.1%	"	"
27th "	1.0	C C of	0.1%	"	"
28th "	1.0	C C of	0.1%	"	"
29th "	1.0	C C of	0.1%	"	"
30th "	1.0	C C of	0.1%	"	"

An ointment was made by taking Mercaptobenzolthiazol and white vaseline (approximately 50% ointment) and applied to the shaved surfaces of rabbits' backs on each of the days that the pigs were inoculated.

A solution of the sodium salt of Mercaptobenzolthiazol was made and the following inoculations were made:

1st day	0.5	C C of	0.001%	Sol
3rd "	0.5	C C of	0.01%	"
5th "	0.5	C C of	0.05%	"
7th "	0.5	C C of	0.1%	"
8th "	1.0	C C of	0.1%	"
9th "	1.0	C C of	0.1%	"
10th "	1.0	C C of	0.1%	"
11th "	1.0	C C of	0.1%	"
12th "	1.0	C C of	0.1%	"
13th "	1.0	C C of	0.1%	"
14th "	1.0	C C of	0.1%	"
15th "	1.0	C C of	0.1%	"

No inoculations for 10 days, then the following was injected intraperitoneally::

25th day	1.0	C C of	0.1%	Sol
26th "	1.0	C C of	0.1%	"
27th "	1.0	C C of	0.1%	"
28th "	1.0	C C of	0.1%	"
29th "	1.0	C C of	0.1%	"
30th "	1.0	C C of	0.1%	"

During these injections and applications of the ointment no reactions were noticed either general or local. The animals maintained their appetites and continued to gain in weight. The pigs were later used to obtain blood for Wasserman work and no effects were noticed in these reactions. On autopsy there was no evidence of any pathological changes in the peritoneum, liver, heart, lungs, kidneys or pancreas. Local application did not produce any dermatitis. After experimentation on animals we approved the general use and manufacture of the substance.

After a definite period of time all the men working with Mercaptobenzolthiazol, either in its manufacture or its general use in compounding were examined. The results of these examinations

did not show any toxic conditions or any dermatoses to have developed. During the last year all men who have been working with Mercaptobenzolthiazol have been examined periodically, and to date no detrimental effects have been encountered.

There is one salt of Mercaptobenzolthiazol, namely, lead Mercaptobenzolthiazol which is toxic. This is due to the lead ion and must be handled as all other lead compounds or there will soon develop some toxic symptoms which are characteristic of all lead compounds.

There are theoretically other compounds of Mercaptobenzolthiazol which are toxic, such as the chromium, copper and other toxic metallic salts, but to my knowledge they are not used commercially.

The men examined should have especial attention given to the following:

1. Urine—Test for benzol radicle and increased sulphur output.
2. Blood—Secondary anemia with increase in sulphoproteids in the white cells.
3. Blood Pressure—Lowering of blood pressure is indicative of a developing anemia.
4. Skin—Irritative dermatoses.
5. Conjunctivae of Eyes—Non-infectious conjunctivities.
6. Nasal-passages—Coryza and atrophic rhinitis.

We have not encountered any of these conditions but from the chemical structure of the compound these are the possibilities. However, from the physical properties of solubility, volatility and fusibility we should not expect to encounter any difficulty with the pure Mercaptobenzolthiazol. If lead Mercaptobenzolthiazol is being used then the blood should be checked for any basophilia, and the urine for lead salts. The temperature at which this substance comes in contact with the human system does not influence its solubility, volatility or absorbibility.

The small amount which is used in the milling processes has its identity changed and should it be broken down the sulphobodies are absorbed by the rubber and Mercaptobenzolthiazol as such no longer exists. The use of any powdered substance should be handled as carefully as possible, and in properly ventilated rooms, not necessarily because of the toxic properties, but because it is a protection for the respiratory system.

Sand dust, soapstone or any other dust may cause a siderosis, anthracosis pneumoconiosis, or a fibrosis of the lung tissue.

Conclusions

Experimental evidence has shown that Mercaptobenzolthiazol as such in a purified form is comparatively non-toxic.

Individuals who have worked with it for some time have not shown any symptoms of absorption.

The commercial product is comparatively free from absorbed toxic substances.

Dermatoses from its use have not developed.

Lead Mercaptobenzolthiazol should be handled as all other lead compounds as used in industry.

Experimental work on Mercaptobenzolthiazol and its derivatives will be continued and reported when finished.

Rubber-Covered Wire Sales

IN SPITE of the depression in business during the last months of 1929, sales in electrical supplies showed an increase of 10 per cent over 1928. This increase was particularly marked in the sales of rubber covered wire, the total wholesaling turnover being $45,432,000. Wholesale sales of rubber covered wire as reported by *The Jobber's Salesman*, for the past seven years were as follows:

1923	$46,783,000
1924	45,987,000
1925	33,085,000
1926	37,815,000
1927	38,640,000
1928	42,095,000
1929	45,432,000

Schaphorst's CHATS *with the* ENGINEER

By W. F. SCHAPHORST, M.E.

"Trifling Losses" in Rubber Plants

A COMMON trouble with many of us is that in searching for losses we look only for the "big" losses. Big losses are usually found easily enough, but on investigation it is learned that the cost of making new installations or alterations would be so great that the plan is abandoned. The initial cost looms up like a mountain.

The "trifling losses," on the other hand, are overlooked by us because they appear to be so small as to be "not worth bothering with." There is such a thing as devoting too much time to small details. But it is a pretty safe bet, in most plants where power is used, that the simple "trifling losses," when added together, amount to more than the single big loss that, because of its bigness, can be plainly seen. Besides, the cost of eliminating the small losses may amount to considerably less than the cost of eliminating the big loss.

For example, a foreman finds that a machine isn't running fast enough. It is 5 per cent too slow owing to slip. He cannot speed it up because it was made for one speed and only one. The foreman may know it, but in addition to the 5 per cent production loss there is a 5 per cent power loss. The driving engine or motor is doing just as much work as though it were pulling full load. The actual load of the driven machine plus the power loss due to belt slip is equal to the full normal load without slip.

Of course the foreman knows or feels that production could be increased by spending a few cents to treat the belts and make them pull without slipping. He also knows that large pulleys are not so likely to slip as are small ones. But he is not fully aware of the seriousness of the loss, neither is the superintendent. He has spoken to the superintendent about the matter but the superintendent says that everything is O.K. aside from the slight 5 per cent production loss. He says to the foreman, "If we wanted to increase the speed 5 per cent we would buy a larger driving pulley for $30, but it wouldn't pay. It's too much trouble and too expensive."

There the matter rests. As a matter of fact, though, a new $30 pulley probably isn't needed at all. About 5 cents worth of first class belt treatment will often put the belt in proper condition to do full work without slipping.

If 5 cents worth of belt treatment will save the cost of a $30 pulley, plus the cost of 5 per cent of the power, plus 5 per cent of production—isn't that worth while? "Trifling losses" are worth investigating and stopping if it is possible to stop them at slight expense, as it usually is. I have made computations of instances where belt treatment has actually paid 30,000 per cent on the investment.

Torrance Galbraith, a Canadian veterinary surgeon, residing at Farncombe, Surrey, England, claims to have discovered a new method of producing rubber from chemical substances and boiling of seaweed and golden rod, according to British press notices. The new rubber is stated to be 95 per cent equivalent to crepe rubber, possessing elasticity and resilience. It is proposed to manufacture the new product at Toronto, Canada, and at Worthing, Sussex, England.

Safety in the Rubber Industry

Abstract of an Address Given Before the Chicago Group, Rubber Division, A.C.S.—Both Mechanical Hazards and Health Preservation Discussed

IN an address Friday evening, May 16th, before the Chicago Rubber Group, American Chemical Society, Mr. R. C. Salisbury, Manager of Health and Safety Dept., Fisk Rubber Company, Cudahy, Wis., presented "Safety in the Rubber Industry," embracing not only corrective mechanical hazards in the industry, but health preservation as well. Thirty-six slides featuring numerous installations for improved ventilation, various mechanical and electrical safety devices were shown illustrating the speaker's talk. An interesting and instructive discussion followed in which many of the membership participated.

Abstract of Mr. Salisbury's Paper

Occupational diseases which each year receive greater prominence and attention by the various State Compensation Boards, present to all industries a problem which must be met through the avoidance of disabling workers through insidious disease, as has been done in the prevention of traumatic injury.

The rubber industry is essentially a chemical industry and involves the use of many compounding ingredients, both organic and inorganic, and numerous organic accelerators and anti-oxidants, together with the consumption of many tons of organic solvents, oils, etc. It thus becomes, at once apparent that the safety engineer in the rubber industry, aside from other qualifications must either possess chemical knowledge, or draw upon the technical department for that which he has but slight information.

Another and more drastic form of disease to have been demerited to the industry in recent years is the so-called Pneumoconiosis. These cases, no doubt, have been laid to us with little justification. The diseases results from the inhalation of large quantities of dust, usually containing silica. The rubber industry uses large amounts of talc, soapstone and mica for dusting purposes. These dusts are not dangerous unless concentration is great, or unless silica be present. Furthermore, they are not toxic but are irritant to the respiratory tracts. In this connection the silicas should not be confused with the silicates—the former is dangerous, but the latter is harmless if pure. Talc, the silicate, is one of the softest and smoothest minerals, while silica is one of the hardest and most abrasive. It is this hard cutting dust which causes silicosis and the one impurity to be avoided in dusting materials.

The first essential in the safe handling of all compounding materials is a knowledge of their chemical and toxic properties. This responsibility must rest with some capable person or at least some one connected with the technical department. The more thorough the knowledge of the property of these compounds and their possible physiological effects, the better able are we to specify how they should be handled in process. This latter usually requires the services of the technical and in many cases the medical department. Thus, in order to properly correlate such data, it is essential that the safety and technical departments work together.

In this present age of competition, we learn there is ever present the danger of ingredient manufacturers being too anxious to get promising new rubber compounds on the market before adequate data has been obtained as to their toxic properties. On the other hand, rubber manufacturers being only too anxious to improve their products are often tempted to accept exaggerated statements of salesmen and put into production promising, but at the same time, more or less untried substances about which comparatively little is known toxically. This practice has recently resulted in injury to the health or comfort of those using these materials. In all such cases, the safety department working in conjunction with the technical department must act as a safety valve.

It is not unusual to find cases where the technical and safety departments are not working harmoniously, either because there is no desire to do so or because the advantage of so doing is not recognized. In the endeavor to cut costs, there is a tendency to use more powerful chemicals and to speed up operations in general. Changes are made so rapidly that the effect upon the workman is often overlooked, and the safety department is not tied in. Cooperation is essential, however, for in the final analysis, production is going to suffer more from neglect to safeguard the health of the employe, which will offset any temporary gain if the latter is made at the expense of the worker's health. The organization with the best record for health and safety is in the long run bound to come out on top, due to reduced turnover, more efficient and contented workers and better morale.

Fortunately most manufacturers are cognizant of certain obligations to their employees in not exposing them to unnecessary and serious health hazards. I have learned that it is often possible to replace many poisonous chemicals with non-poisonous ones without in any way affecting the quality of the product, and thereby completely eliminating serious health hazards.

Most of you are familiar with the successful effort in eradicating aniline poisoning from the rubber industry somewhat over a decade ago. Aniline oil was used in immense quantities and at that time it was no uncommon sight during hot weather to see dozens of operatives carried out, having been overcome with aniline fumes. In those days workmen handled aniline oil like so much water, not realizing the dangers they were confronted with. The result being that the rubber industry's severity rate in accident experience suffered.

It was realized in the rubber trade that aniline must be either eradicated or safe methods installed for handling it. As a result, within a few years, it was almost entirely eliminated from the industry and where used, apparatus had been installed to insure its safe handling. As a result we scarcely hear of aniline poisoning today.

The same is true of benzol. It was thought at one time that benzol and coal tar naptha were necessary for rubber cements and for gassing rubber stocks, but today various petroleum distillates have almost completely displaced the benzol. Therefore, the real hazardous compounds used in rubber manufacture, such as aniline benzol, carbon disulphide and lead compounds have within recent years been largely eliminated. Litharge is quite extensively used in certain lines of manufacture, but its poisonous effects are now well understood and due care is or should be taken in its handling. In view of our present knowledge of many of these compounds there is very little excuse for death or even serious poisoning from these sources.

In summing up the following points are to be stressed:

1st: Closer cooperation between the technical and safety departments.

2nd: A positive effort on the part of the technical department to acquaint itself with the problems of health throughout the plant.

3rd: Elimination of all discovered hazardous compounds and where this is not possible, provide safe means for handling them.

4th: Foremen and workers alike, handling hazardous materials should be posted in the correct way to handle them and should be impressed with the importance of obeying instructions.

Inspection of Rubber Gloves for Electrical Workers

THE importance of rigid inspection of rubber gloves for high voltage electrical work is stressed in an article in *The Travelers Standard*, the publication of the Travelers Insurance Company.

Ridges, variations in thickness, air bubbles and blisters are likely to be caused by introducing the glove-shaped porcelain forms into the rubber solution at too rapid a rate or removing them in the same way, as well as by using a solution of improper consistency.

Variations in the drying rate, as between gloves on the same rack, and "boiling of the solvent" on humid days, vex the manufacturer. This so-called "boiling" of the solvent is manifested by air bubbles which work their way up from the bottom of the dip tank to the surface of the solution and form air pockets when they come in contact with the glove forms. It is almost impossible to get rid of these air pockets without weakening the affected portions of the gloves. Unless these various difficulties are surmounted, the quality of the finished product will be affected and the gloves will fall short of the perfection which is essential for the protection of electrical workers.

Standard Tests for Gloves

Rigid inspections of the glove should be made to discover possible ridges, blisters, and other similar imperfections, any of which is sufficient reason for rejection, without further test. The electrical test should consist in immersing each glove in water (contained in a metal tank) up to within 1½" to 2" of the edge of the cuff, the glove itself being filled with water up to the same level. A high-tension electrode should be placed inside the glove, and the tank connected to ground. Each glove should withstand, for three minutes, an alternating "potential" of 10,000 volts at 60 cycles per second, without showing a leakage-current of more than 10 milliamperes (total current) at any time during the test. This is the standard test specification for gloves intended for use on circuits where the potential does not exceed 3,000 volts to ground.

Some companies permit their employees to work on live lines carrying voltages in excess of 3,000 and apparently their accident rate compares favorably with that of companies limiting their live-line work to lines of 3,000 volts or less. It should be noted, however, that the companies that sanction work with the higher voltages do not depend upon gloves alone for protection of their men, but in addition employ special tools, insulating platforms, and other safeguards. Recent investigations, coupled with the development of a new method of testing rubber gloves, indicate that companies whose employees work at the higher voltages must make absolutely sure of the effectiveness of the auxiliary protection, in order to avoid unnecessary hazards.

New Testing Methods

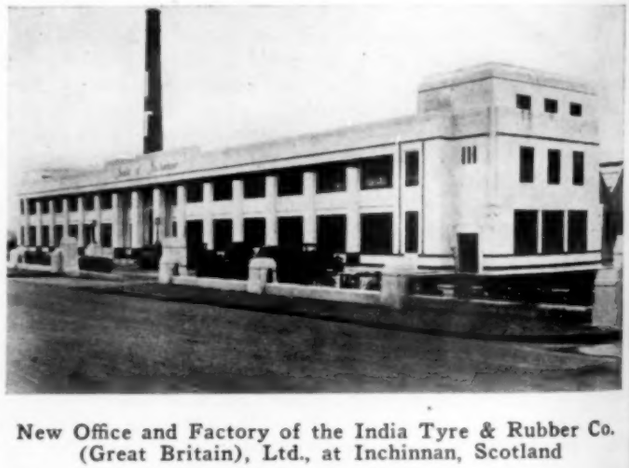
The new method of testing gloves consists in folding the fingers of a glove about a line-wire conductor and fastening them with a rubber band, so as to produce a grasping contact. The glove is filled with wet cotton, and current is introduced into this filling. The gloves are thus tested under conditions that closely approximate those associated with the actual work.

Some experimental tests have been made in this manner, and one of the notable features of them is the outcome of the exposure to "corona," through the action of ozone at potentials above 3,000 volts. Judged by these tests, the life of a glove, when used without auxiliary protective devices on circuits carrying over 3,000 volts, can be measured *in minutes*. The average life of several specimens tested at 4,200 volts, was 11 minutes for the product of one manufacturer and 18 minutes for that of another concern, while at 3,600 volts, the averages were 17 minutes and 35 minutes respectively. The significance of these tests lies in the fact that the test conditions are duplicated whenever a workman not insulated from ground, grasps with his gloved hand a conductor carrying current at a pressure in excess of 3,000 volts. The glove will be subjected to the deteriorating action of ozone, and its protective value may be reduced to zero in a few moments. The inevitable conclusion is, that at the present time we cannot safely accept even the best-made glove as the sole form of protection against shock, when work is to be done on circuits carrying more than 3,000 volts.

It requires little imagination to picture the result in case a workman while wearing a defective rubber glove should bring the defective part in contact with a live circuit and, in the course of his work, stretch or stress the rubber. In all likelihood the defect would be magnified many times by the stretching, and the workman would then be in grave danger of receiving a fatal shock. Notwithstanding the non-fatality record associated with gloves of standard manufacture, the policy outlined above, of systematically inspecting and testing new rubber gloves is well worth the while of manufacturers.

India of Inchinnan

THE new offices and factory of India Tires, Ltd., at Inchinnan, near Glasgow, Scotland, was recently formally opened by J. H. Thomas, M. P., Lord Privy Seal, when a golden key was presented to him by Mr. Naismith, the chairman of the company. Mr. Thomas was later present at a banquet given to over 400 people at the Central Station Hotel, Glasgow, where, among other distinguished guests, were present James Brown, High Commissioner for Scotland, Sir George May, Sir Horace Wilson, Sir Harry Hope, and Sir William Sleigh.



New Office and Factory of the India Tyre & Rubber Co. (Great Britain), Ltd., at Inchinnan, Scotland

The opening ceremony, which was followed by a tour of the works, was attended by over 5,000 people, who came from all parts of the country, special trains being run from London, Bristol, Birmingham, Leeds and Newcastle, while a specially chartered steamer brought the Irish Free State agents from Dublin and an Imperial Airways liner flew north from London with still more guests. The plant is located on a site comprising 60 acres, which was acquired in 1927, and upon which the Airships R 33 and R 34 were built some ten years ago.

The Behavior of Pigments During Mixing and Curing*

By HARLAN A. DEPEW

New Jersey Zinc Company

WHEN rubber is broken down on a mill or masticator and the pigment is added, little groups of pigment particles are trapped and carried into the interior of the mass of rubber. These small groups of unmixed pigments sometimes remain in this form and roll around as little soft pellets in a sack. If they remain unmixed in the finished product, they generate heat in service and cause undue heating that may result in a solid tire blowout or explosion (Figure 1). Fortunately, however, the groups usually break up and the individual particles are carried into the rubber and surrounded by it. These articles will be referred to as dispersed. The particles move around during the mixing and in the course of time two of them meet, and then, if the magnitude of the forces which hold them together is sufficiently great, they will remain together. If the particles do remain together, they will meet other individual particles or groups and form larger groups; these groups, if enough

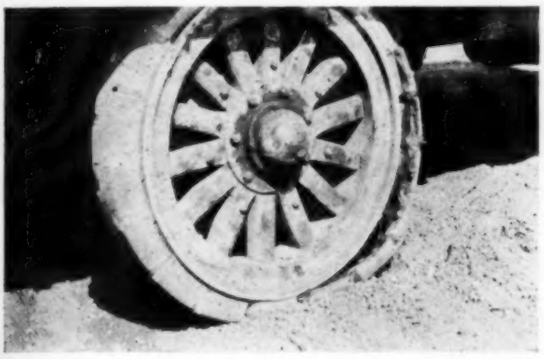


Figure 1
Solid Tire Blowout

are present, will touch one another and extend throughout the mass. In the course of the mixing they will break up again and again, constantly rearranging into new configurations. These groups are spoken of as flocculates (Figure 2). The difference between flocculates and unmixed pigment groups lie in the fact that while rubber surrounds each particle in the flocculate, there is only air between the particles in the case of unmixed pigment, and in that forces are holding the particles together rigidly in the flocculates.

Some pigment particles in the process of manufacture or due to conditions of storage, become cemented together and several particles behave as a large individual particle and they are designated as an aggregate.

To summarize, the conditions under which a pigment exists in rubber are as follows:

1. Aggregated
2. Unmixed
3. Dispersed
4. Flocculated

Probably in every piece of rubber part of the pigment will be in each of the four conditions and when a pigment is spoken of as flocculated it means that most of the particles are in a grouped condition, but that there are undoubtedly a few aggregates, some dispersed material, and a little unmixed material. .

Referring to Figure 2, it can be seen that flocculated pigment exists in a sort of a structure and that it ought to harden rubber. The following experiment shows that flocculation does cause hardness just as would be expected.

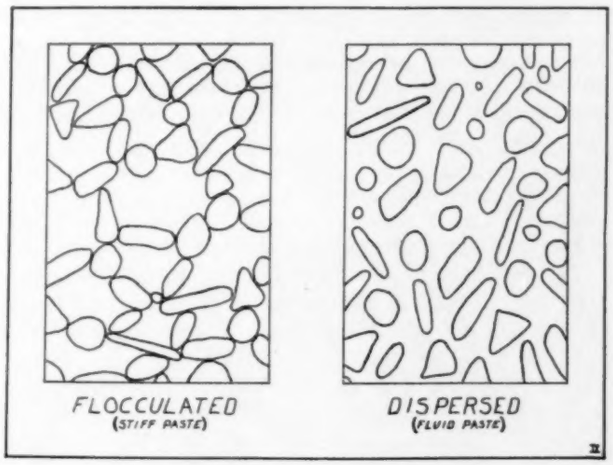


Figure 2
Comparisons of Flocculated and Dispersed Pigment All the particles are surrounded by kerosene but the flocculated particles are touching one another

A pile of zinc oxide is rubbed down with kerosene until it becomes a smooth plastic mass that can be molded into various shapes. A small piece of solid stearic acid is rubbed into the once plastic mass and changes it to a thin fluid. Microscopic examination before and after the stearic acid has been added shows that the zinc oxide in the stiff material is flocculated (Figure 2), whereas after the stearic acid has been added, each particle is separate and dances across the field of the miscrope.

The value of the microscope in explaining the behavior of the pigments in the kerosene-stearic acid experiment suggests that it can be employed equally well in studying pigments in rubber, and, to prevent over-confidence in this instrument, it will be well to mention some of the difficulties. First, rubber is stiffened by a small amount of pigment which indicates that the particles influence a zone in the

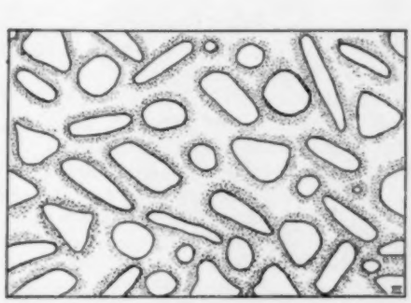


Figure 3
Visualization of the Idea of Zones of Influence in the Rubber Around Pigment Particles

*An address presented to the Chicago Rubber Group of the A. C. S., March 21, 1930. The material for the talk was largely obtained from two papers by the author, RUBBER AGE, Jan. 10, 1929, Vol. 24, No. 7, p. 378, and *Journal Ind. & Eng. Chem.*, Vol. 21, No. 11, p. 1027, Nov. 1929.

rubber around them. Figure 3 visualizes this zone of influence around each pigment particle and shows how a sort of structure can exist, without actual particle to particle contact. Under the ordinary microscope there would be no evidence of structure, since the rubber in the zones of influence would look the same as the balance of the rubber. Secondly, it is more difficult to obtain good rubber sections than oil mounts. Third, there is no flocculation of the particle to particle contact type in pigments with a particle size above the resolving power of the microscope (about .15-.20 microns) and fourthly, during that most interesting stage when the rubber is very thin and fluid during the early stages of vulcanization microscopic technique does not permit the use of extremely high powered magnification.

Rubber probably in part because of its viscosity, is one of the best of dispersing mediums, especially for chemically active compounding ingredients such as zinc oxide, and its dispersing power is increased by the small amounts of its organic acid and oxidized resins present in it.

It is evident that it will be difficult to improve the dispersion of pigments compounded in it. There is evidence, however, that in certain cases this can be done. An unvulcanized Kadox stock is hard and insoluble in benzene which is evidence that the pigment is somewhat flocculated. The incorporation of stearic acid in addition to the organic acid normally present in the rubber, greatly softens it and renders the stock much more soluble.

A little stearic acid is very effective but additional amounts are relatively less effective whereas with many other softeners the effect of increasing amounts is more nearly a smooth curve (Figure 4).

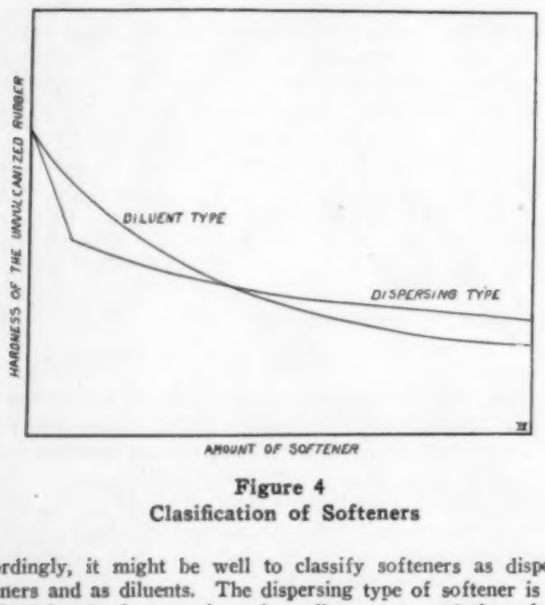


Figure 4
Clasification of Softeners

Accordingly, it might be well to classify softeners as dispersing softeners and as diluents. The dispersing type of softener is characterized by the large action of small amounts and the relatively small effects of further additions. The dispersing softener may have some effect on the two or more rubber phases present in the compound as well as on the pigments. It is also quite possible that a softener may show the dispersing type of softening with certain compounds and a diluent type of softening with other compounds. It is interesting that although stearic acid has a dispersing effect on fine zinc oxide particles in unvulcanized rubber, it is agreed by a number of recent writers that it does not disperse carbon black, which is relatively inert.

A confusion in terminology frequently exists since operating men usually mean reducing the amount of unmixed pigment when they refer to dispersing pigments in rubber. In this sense, they do not distinguish between dispersed and flocculated pigment.

The whole problem of the factory working of rubber stocks is linked up with the behavior of the pigment particles. Coarse pigments that disperse well show good factory working whereas the finer pigments frequently give a scorched appearance to the stock, due to a certain amount of elasticity. The effect of this elasticity on a stock that is being tubed is shown in Figure 5. The structure that has developed causes the stock to tube with difficulty. In this particular case the addition of a small amount of stearic acid overcomes a large part of the trouble. If there should be an appreciable

Figure 5

Tubed Solid Tires
Flocculated pigment causes the rubber compound to tube roughly, but the addition of a small amount of stearic acid causes it to tube smoothly

amount of unmixed pigment, the stock would be dead and would show better tubing and calendering properties.

Solid materials are wet by liquids to varying extents and it is extremely difficult to submerge the last face of a solid in a liquid. That is to say, it is hard to completely surround a pigment particle with rubber and because of this difficulty the surface of many rubber stocks are dry. The surface is one of rubber with pigment particles sticking out of it. A pigment well wet by rubber will completely submerge in it and the surface of a calendered sheet containing it will be a clean rubber surface and accordingly it will be easy to obtain good unions.

When the rubber stocks are placed in storage (if they are) between mixing and processing, the rubber is so immobile that the pigments cannot migrate and the evidence of this is shown by the fact that the consistency of the stock as shown by the thickness after three minutes in the Williams' press does not change on storage (Figure 6). There is a decrease in the solubility of the rubber compound but this is due to a secondary weak structure; possibly an orientation of the protein particles.

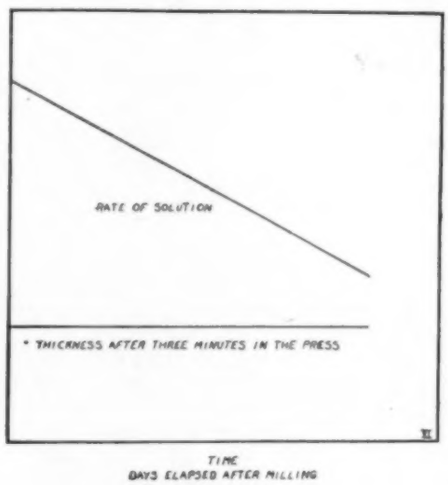


Figure 6

The Effect of Storage on the Consistency and Solubility of Unvulcanized Rubber

The discussion so far has only considered the distribution of pigments in unvulcanized rubber and the distribution may be quite different in rubber that has been hot vulcanized because, although the pigments do not move during storage, there is a moment when the compound is first heated when it becomes rather fluid and the particles migrate and become better dispersed in some cases and more flocculated in other cases.

Reinforcement of vulcanized rubber by pigments is largely dependent on the particle size of the pigment, but the kind of reinforcement obtained with fine pigments will depend on the dispersion of the pigment in the vulcanized rubber. If the particles are

flocculated they will harden the rubber as has already been mentioned and the hardness will result in a high resistance to cutting. If the particles are well dispersed they will harden the rubber to the extent that they influence the rubber immediately surrounding them, and they will greatly increase the tear resistance due to the fact that they act as obstacles in the path of a tear and change its direction so that component of the force in the direction of the tear is relatively small. Flocculated pigment may also increase the tear resistance to a certain extent. Figure 7 illustrates the effect of

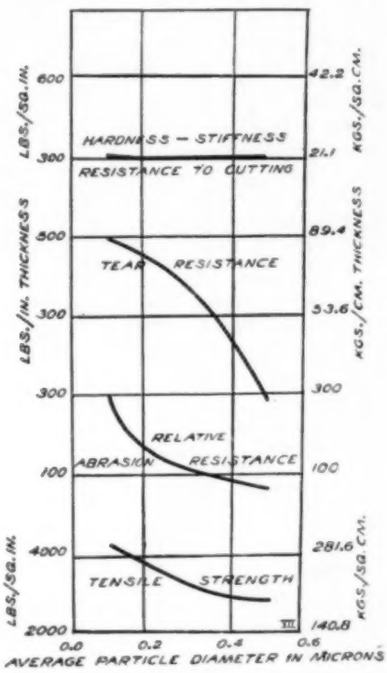


Figure 7

The Influence of Particle Size on the Rubber-Making Properties of Zinc Oxide

particle size on rubber properties of a pigment material that disperses well in rubber. The compound used for obtaining these data contained about 50% of zinc oxides. Although the stiffness was independent of the particle size of the zinc oxide, there would have been an increasing stiffness if a more highly compounded stock had been used owing to the interaction of the zones of influence in the rubber around the particles.

The study of the behavior of pigments in rubber has been shown to be of vital importance in studying the factory working of rubber stocks and it should be helpful in explaining many compounding problems. For instance, certain organic materials (accelerators and otherwise) may affect the zones of influence around the particles and thereby influence the cutting and tearing resistance of the vulcanized product. They may also greatly influence the flexing and other properties of the rubber compound.

"Baked" Rubber Running Boards

AS AN innovation in running board construction on automobiles, the Chrysler Corporation has recently developed a new "baking" process of adhering rubber mats to the running boards. The new running boards will be standard equipment on the DeSoto sixes and Chrysler eights.

A universal difficulty with running boards has frequently been the formation of "bubbles" after the car has been in service a while. These "bubbley" blister-like swellings of the rubber mat show that the rubber cement has failed to hold it to the board.

When the DeSoto corrugated steel running board was perfected, a special cement was created by the engineers for attaching the rubber, and then new machinery was devised for putting it in place so that it would not come loose. The next problem was to obtain just the right amount of tackiness, or stickiness, of the cement, and to apply the rubber to the board under absolutely equal pressure over the entire surface.

A baking process takes place in a newly developed machine. There are two feeding tables, one on each side. An endless belt conveys the rubber mats into the machine on one side, a similar conveyor bringing the boards on the other. Both are automatically coated with the special cement as they pass into the machine.

As the boards enter the oven, traveling shelves pick them up and carry them over the arch and down the other side. As they travel this course, the volatile solvents used to make the cement are driven out by the heat, leaving the cement in just the right condition to make a lasting bond.

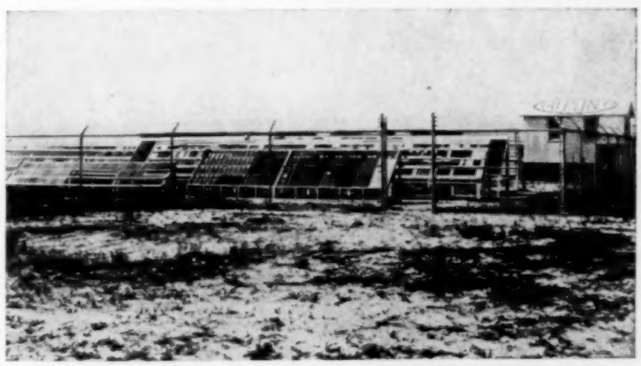
The rubber mats are also carried through the oven. As boards and mats emerge, the rubber is laid upon the board and a cover plate working by air pressure comes down and presses the rubber to the steel.

DuPont Testing Station in Florida

ONE of the most unique testing laboratories in the United States is maintained by E. I. du Pont de Nemours and Company, at Hialeah, Florida.

The exposure of materials at the Hialeah testing station includes Duco, lacquers, rubber coated fabrics, pyroxylin coated fabrics, pyralin, non-shatterable glass, paints, varnishes and enamels. This station has been of special assistance in connection with development work on preventives of sunchecking and non-discoloring antioxidants.

At the present time approximately 10,000 panels are on exposure at Hialeah. Most of these panels are examined



DuPont Testing Station at Hialeah, Florida

weekly and all of them receive periodic examinations, the results being reported to the laboratory that submitted these samples for exposure. Two men are required to make periodic examinations of the panels under test.

Hialeah is near Miami and that location was chosen because tests have shown that sunchecking proceeds more rapidly there than at any other point in the United States and the surprising fact is that the average rate of sunchecking at Hialeah is twice that at Jacksonville, which is due in a small measure to the fact that Hialeah is further south but principally to the fact that the upper layers of the atmosphere are clearer, i. e., there is less suspended dust in the air and there also appears to be, on the average, less cloudy weather.

Extra copies of the Index to Volume 26 of THE RUBBER AGE may be secured upon request. It was printed as Section II of the April 10th issue.

Russian Rubber Growing Project Fails

THE plans for the rapid creation of Soviet rubber plantations and the production of home-grown rubber on a large scale in the Union of Soviet Socialist Republics have miscarried, and the officials of the "Caoutchouc Trust" are being accused in the Soviet Press, according to dispatches in *The Times*, of London, from its Riga correspondent.

The Caoutchouc Trust was established by a special decree last year, after Soviet scientists had experimented for three years in the laboratory with some wild shrubs which had been found growing in the sands of Turkestan. The scientists had reported that the shrubs were rich in caoutchouc latex of high quality, which would enable the Soviet Union to "emancipate herself" from the rubber capitalists of the West. Orders were issued that during the spring of 1930 this new State trust should plant 10,000 hectares (24,710 acres) with the newly discovered rubber shrub; the news has now been published at Moscow that the trust has been able to lay down no more than two hectares (4.9 acres) of rubber plantation and that the planters are not quite sure whether they have collected the proper shrub or a similar one which makes good progress but yields no rubber.

Professor Bosse, who is being made one of the chief scapegoats, has published his explanation of the failure of the plans for this year in *Za Industrializatsiya*, the official organ of the Supreme Economic Council, of May 16. He states there was still much laboratory work to be done when the trust was ordered to begin planting; but officials in other departments were unsympathetic and work was consequently slow. The process of analysis, for example, required that the substances delivered to the laboratory should be ground in special mills. They had no such mills, and were therefore obliged to canvass the State food-shops for the loan of coffee mills, as there were none for sale. They found a few mills at last, but although they were idle the officials would not lend them.

There were further difficulties, according to the professor, on the planting grounds. Not only were the planters apt to cultivate by mistake the wrong wild shrubs native to Turkestan, but they had destroyed the fruits of his (the professor's) expedition to Mexico in search of a rubber plant which might thrive on Soviet territory. He had brought back seeds of the Mexican *Parthenium argentatum* shrub (which yields guayule rubber), and had started a small plantation in Turkestan. When he was absent the official left in charge "weeded" the plantation and, through deficient botanical knowledge, destroyed all the guayule plants in favor of a weed, which throve well under his cultivation, but was quite useless for the rubber industry.

I. R. I. Holds Annual Dinner

PRESIDING at the annual dinner of the Institution of the Rubber Industry, held in London towards the end of May, Eric Macfayden, the chairman, declared that there had never been a time when rubber was produced in greater abundance or sold more cheaply, and never a time when a better service in manufactured articles was given to the public.

The institution's principal guest was Walter Runciman, M.P., who said that one of the great paradoxes of today was that while we were living in a time of great abundance of commodities there had never been so much depression in trade and commerce.

New Tire Fabric Standard Specifications

COMMITTEE D-13 on Textile Materials of the American Society for Testing Materials at their last meeting in Charlotte, N. C., on March 14, 1930, proposed various recommendations for changes in the standard specifications on tire fabrics. These proposed changes are as follows:

No. 4. *Standard Specifications for Tolerance and Test Methods for Tire Fabrics Other than Cord Fabrics* (D122 27):

Section 3.—Change from its present form: namely,

3. The weight per square yard of the roll or piece determined by test shall not be more than:

(*a*) Two and one-half per cent over or under the specified weight per square yard for fabrics over 11 oz. per sq. yd. in weight.

(*b*) Three per cent over or under the specified weight per square yard for fabrics 11 oz. per sq. yd. or lighter.

to read as follows:

3. (*a*) The weight per square yard of an individual roll or piece determined by test shall not be more than 2.5 per cent over or under the specified weight per square yard for fabrics over 11 oz. per sq. yd. in weight and not more than 3 per cent over or under the specified weight per square yard for fabrics 11 oz. per sq. yd. or lighter.

(*b*) The average weight per square yard of a shipment of 10 or more rolls or pieces as determined by test shall not be more than 1.5 per cent over or under the specified weight per square yard for fabrics over 11 oz. per sq. yd. and not more than 2 per cent over or under the specified weight per square yard for fabrics 11 oz. per sq. yd. or lighter.

A shipment of less than 10 rolls shall be considered as individual rolls.

New Section.—Insert in the body of the specifications as a new Section 10 the present reference to Methods D 39, now appearing as a footnote, renumbering the subsequent sections accordingly.

Section 14.—In the second paragraph, change the next to the last sentence to read as follows, by the addition of the italicized figure and the omission of the figure in brackets:

The speed of the pulling jaw shall be [20] *12* in. per minute.

Add a new third paragraph under this section to read as follows:

Tensile strength shall be determined either in dry condition or standard condition as defined in Sections 2 and 3 of the Standard General Methods of Testing Woven Textile Fabrics (A.S.T.M. Designation: D 39) of the American Society for Testing Materials, by either the strip or grab test as specified in Section 12 of the Standard Methods D 39, as may be required in purchase or fabric specifications.

No. 5. *Standard Specifications for Tolerances and Test Methods for Cord Tire Fabrics* (*D* 179—*27*).

The revisions proposed in these specifications include a change in the title, the addition of a new paragraph to Section 3 covering a tolerance on the average weight of shipments of 10 or more rolls or pieces, and a complete revision of the methods of testing.

No. 6.—*Tentative Specifications for Chafer Tire Fabrics* (*D* 316—*29 T*).—*Table I.*—Change the tensile strength requirements given in Table I for the construction indicated to read as follows by the addition of the italicized figures and the omission of those in brackets:

			8-oz. Fabric 14/2 ply Construction		9-oz. Fabric 10/2 ply Construction		12-oz. Fabric 12/4 ply Construction	
Tensile Strength, lb.	Grab Test Conditioned	Warp	[105]	*100*	[120]	*115*	[155]	*145*
		Filling	[115]	*110*	[130]	*125*	[165]	*155*
	Grab Test Bone Dry....	Warp	[75]	*70*	[80]	*75*	[105]	*100*
		Filling	[80]	*75*	[90]	*85*	[115]	*130*

AS AN indication of the work which is being done by the Rubber Division of the Bureau of Foreign and Domestic Commerce, Washington, D. C., the Department of Commerce recently reported that the Division had rendered 546 distinct commercial services in the interest of the domestic industry during the week ending May 10, and a total of 22,836 services during the period from July 1, 1929, to May 10, 1930.

United States Trade in Rubber Toys

OF THE many million rubber toys, play balls, and balloons, manufactured each year in the United States, a value of over $1,000,000 is exported annually, totaling $935,245 in 1927, $954,254 in 1928, and $1,103,528 in 1929—the peak year, according to reports of the U. S. Department of Commerce. These exports go to every continent. By far the largest portion—about 81 per cent—of the trade is in toy rubber balloons. In 1929 the United States exported 823,222 gross of balloons, valued at $892,965, making an average unit value of about $1.08 per gross, or just a little less than 1 cent each. The trade in rubber toys and balls, exclusive of tennis and golf balls, reached its peak also in 1929, with a value of $210,563.

Of toy balloons the United States is the leading supplier of the world, although competition is met with from Germany, Japan, France, Belgium, and perhaps the United Kingdom. During 1929 the United States sent balloons to 95 different foreign markets, with the trade extending from 4 gross to Tahiti, in French Oceania, to 359,993 to the United Kingdom.

In the trade of rubber toys and balls the United States has not been able to exceed the well-developed industry of several European countries. Although comparable statistics are lacking, it is believed that Germany, Austria and Hungary — long noted for their toy industries—export greater quantities than the United States.

United States Exports of Toy Balloons

Country of destination	1927	1928	1929
United Kingdom	236,072	256,999	359,993
British India	59,162	99,054	101,035
Mexico	35,202	39,945	67,781
Canada	37,833	35,760	36,051
Netherlands	10,106	19,603	23,416
Brazil	11,916	17,671	21,206
Germany	6,003	2,595	17,476
Cuba	8,938	7,552	16,199
Chile	18,071	8,521	11,430
Other countries	138,237	137,307	168,635
Total	561,540	625,007	823,222

In foreign countries toy rubber balloons find various uses. They are playthings for the grown-ups as well as children. They are used in increasing quantities throughout the world as favors at cabarets, balls, parties, and soirees, and during religious and national celebrations. Besides, they are now employed for decorative purposes in shop windows, in ball rooms and in the home for festive occasions. One of the unique uses is for advertisement, which is well developed in Italy, France, and other countries.

The United Kingdom has been consistently the foremost United States market for toy balloons, taking 44 per cent of the total exports in 1929, in spite of the fact that they are produced locally by British factories. It is estimated that the United Kingdom received fully 50 per cent of its total requirements from America.

United States manufacturers of rubber toys and play balls have reached a high degree of efficiency and supply almost the entire domestic consumption. The export trade, however, has not reached a comparably large figure, but showed an increase of 4 per cent for 1929 over 1928.

In this line United States manufacturers meet keen competition, particularly with Hungary. The latter country has been foremost in perfecting the manufacture.

The United States' second best market is British India, where toy balloons play a prominent part in the numerous religious celebrations throughout the Empire. The annual consumption is estimated at a value in the neighborhood of $100,000, of which the United States furnishes more than 50 per cent. The United States monopolizes the trade in the higher quality balloons, while Japan is rapidly displacing Belgium as the leader in the cheaper grades.

Value of United States Exports of Rubber Toys and Play Balls

Country of destination	1927	1928	1929
Canada	$37,609	$62,208	$66,402
Mexico	24,741	24,734	39,119
Cuba	14,731	13,091	14,239
Australia	5,907	8,928	10,239
Other countries	93,123	94,156	80,564
Total	$176,111	$203,117	$210,563

The United States' three best markets for rubber toys are Canada, Mexico and Cuba, all of which are adjacent to our ports. More than 25 per cent of the total exports go to Canada.

Comparative Financial Position of the Leading Rubber Companies*

As of December 31, 1929 Unless Otherwise Noted	Goodyear	U. S. Rubber	Goodrich	Firestone Oct. 31, 1929		Fisk	General Nov. 30, 1929
Net Sales, 1929	$256,227,067	$192,962,040	$164,494,957(f)	$144,585,804		$52,790,476	$27,200,000(b)
Increase over 1924	84%	12%	50%	69%		0	97%
Funded Debt(a)	83,749,271	81,236,400	33,772,702	22,758,200		17,414,500	0
Preferred Stock	79,618,700	65,109,100	32,720,000	60,000,000		20,421,100	3,343,400
Number Common Shares	1,398,139	1,464,371	1,053,638	2,239,860		1,705,037	83,599
Present Market for Common	83	28	40	23		4	145
Market Valuation of Common	116,045,537	41,002,388	42,145,520	51,516,780		6,820,148	12,121,855
Par Value of Prior Obligations	163,367,971	146,345,500	66,492,702	82,758,200		37,835,600	3,343,400
Total Market Valuation	279,413,508	187,347,888	108,638,222	134,274,980		44,655,748	15,465,255
Per Cent Represented by Common	41.5%	21.9%	38.8%	38.3%		15.3%	78.5%
Earned per Common Share on Basis of Capitalization as of latest year-end:							
1928	$5.54	nil	$1.16	$2.45(g)	$1.55(h)	nil	$19.01
1929	9.33	nil	4.89(f)	3.27(g)	1.84(h)	nil	15.99
Earned on Present Total Market Valuation(c):							
1928	6.6%	nil	5.5%	6.1%		nil	11.6%
1929	8.3%	1.4(e)	9.6%(f)	6.6%		nil	9.9%
Current Assets	$131,455,470	$116,752,338	$90,524,123	$88,455,267		$25,205,516	$10,333,781
Current Liabilities	15,541,807	37,303,973	31,239,853	8,537,157		2,394,962	3,114,724
Working Capital	115,913,673	79,448,365	59,284,270	79,918,110		22,810,554	7,219,057
Working Capital Per Dollar of Sales	$0.45	$0.41	$0.36	$0.55		$0.43	$0.27
Inventories	66,111,896	57,499,934	46,284,915	41,228,632		14,457,457	5,323,227
Inventories Per Dollar of Sales	$0.26	$0.30	$0.28	$0.29		$0.27	$0.20
Net Tangible Assets Per Common Share	$36	$32	$55	$30		$5	$145

(a) Including funded debt and preferred stocks of subsidiaries.
(b) Gross sales.
(c) Taking bonds and preferred stocks at par, common at market prices.
(e) After deduction of $2,464,000 extraordinary expense.
(f) Sales and profits of Hood Rubber Company, Inc., are included only since August 30, 1929, the date of acquisition.
(g) After actual preferred dividend payments.
(h) Deducting a full year's dividend requirement on new Preferred which resulted in $40,000,000 addition to capital investment.

*Editor's Note.—The above table is reprinted from a recent circular of Otis and Company, New York and Cleveland. Stock value figures are taken as of May 16, 1930.

EDITORIAL COMMENT

Rating Rubber Laboratories

IN 1927 a few of the larger rubber manufacturing and chemical supply companies financially supported some experimental work done at the Bureau of Standards, Washington, leading toward a standardized laboratory procedure for the physical testing of rubber. During the years 1928 and 1929 the Rubber Manufacturers Association supplied the financial support. The Physical Testing Committee of the Rubber Division of the American Chemical Society consisted during these years of representatives of the following companies:

Binney and Smith Company; Boston Woven Hose & Rubber Company; Bureau of Standards; E. I. Du Pont de Nemours & Company; Bureau of Standards; E. I. Du Pont de Nemours & Company; Firestone Tire & Rubber Company; Fisk Rubber Company; B. F. Goodrich Company; Goodyear Tire & Rubber Company; Raybestos-Manhattan Company, Inc.; United States Rubber Company; R. T. Vanderbilt Company.

The committee recently formulated an "Outline of Tentative Standard Laboratory Procedure for the Preparation and Physical Testing of Rubber Samples," which was printed in THE RUBBER AGE of January 25th, 1930.

It is now highly desirable, if further progress is to be made, to have as many laboratories as possible conform as nearly as possible to this standard procedure as laid down by the Physical Testing Committee. Toward that end the three chemical companies represented on the committee have offered the services of a few of their technically trained men to visit laboratories wherever they are invited to do so for the purpose of explaining the details of this standardized procedure, and of giving the laboratory a percentage rating in accordance with that standardized procedure. It is clearly recognized that at the present time most laboratories will obtain a relatively low rating, but it is to be hoped and expected that within a few weeks or a few months time, at the relatively low cost, these laboratories can be brought much more nearly in accord with the standardized method of testing, and that they may after a few weeks or a few months time ask for a new rating, which would be much higher than the original rating given. It would be quite gratifying if the average rating of all the laboratories in the country could be shown to have been materially raised during the few months period.

It is to be hoped that many of the rubber manufacturing companies will take advantage of this plan, which in turn should aid them in further increasing their individual laboratory efficiency. Ratings of individual laboratories will not be disclosed.

Business is Improving

THE National Business Survey Conference in its latest report on business and industrial conditions sees a great improvement over the last few months. Although their survey only goes up to the end of April there is every indication that the rate of improvement in most industries was maintained through May and that conditions are continuing to improve daily. The report points out that the larger American industries are continuing to carry out the construction programs forecast last December and that continued large capital improvements supported by large scale financing evinces a confidence in enlarged future earning power and preparation for it.

In its specific analysis of the automobile and tire industries, the report states that April motor vehicle production of 467,000 units exceeded all previous Aprils except 1929. Dealers' stocks of both new and used cars are reported below normal for this time of year. Foreign sales in March were 71,000 cars but in the first quarter of 1930 foreign shipments declined 46% below the first quarter of 1929. Payroll indicies of automobile manufacturers indicate April 4% over March.

Tire production in April of 4,494,910 increased about 15% over March and 23% over February. The price index was slightly lower than in March. Pay roll index for April was about 9% over March. Reports indicate automobile parts and accessories continue active.

Unhealthy Prices

THE decline of crude rubber on the New York market to the almost record low level of 12.70 cents per pound calls for comment. Only once has a lower price obtained and that was in June, 1921, during a period of extreme industrial depression. While this low price may be of benefit to the consuming industry it cannot but have boomerang effect later on. Market prices below the cost of production are unhealthy for any industry.

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General Manager.....PETER P. PINTO
Managing Editor.....J. P. BUSHNELL
Assistant Editor.....T. H. DAVISON
Circulation Manager.....A. M. SMITH

Representatives in all the rubber centers of the United States, Canada, England, France, Germany and the Middle East.

The Rubber Industry's CURRENT NEWS

Financial—Personals—New Rubber Products—
Building Operations—Manufacturing—Exports

U. S. RUBBER PLANS TO EXPAND WINNSBORO MILLS

Three important steps are included in the expansion program of the United States Rubber Company's cotton mills at Winnsboro, S. C., where all cord used in the manufacture of United States tires is made. First, the capacity of production will be increased about 17 per cent. The work of installing additional equipment will be started immediately, and the additional production is expected to be available in July.

The program of improvements also includes the demolishing of a group of the older houses heretofore occupied by the mill workers but not up to the standard of the majority of the houses. They will be replaced by attractive, modern homes in pleasant locations—making the separate little township of "U. S." people in Winnsboro as handsome a residential center as is to be found in any similar community in the country.

A third important undertaking, on which work will be started at the same time, is the construction of a modern, well equipped community house. It will be located on a high point in the center of the village, and will include a gymnasium, showers, locker room facilities for men and women, a kitchen, an attractive lounge, bowling alleys, billiard parlor, lodge rooms, a motion picture theatre, reading room and a barber shop.

While most of the cotton mills of the South have been working short hours, the heavy demand for U. S. tires has made it necessary for the Winnsboro Mills to operate at close to the maximum capacity since the first of the year. Further increase in this demand has resulted in a recent order to turn out every pound that the present machinery and equipment will permit and rush work on providing increased capacity.

New Carbon Black Plant

The Etnane Carbon Company has secured a permit from the Texas Railroad Commission to construct a plant in the Big Lake field for the manufacture of carbon black by burning the residue gas that comes from the casinghead gasoline plants there. The proposed plant will have an initial consumption of 1,000,000 cubic feet of residue gas daily. Under provisions of the permit, the capacity of the plant may be increased to 5,000,000 cubic feet daily, provided there is sufficient residue gas available.

Effigy of Movie Lion Produced by Goodyear

Leo, the famous Metro-Goldwyn-Mayer lion, was well represented at the M-G-M convention in Chicago last month by an unusual effigy. His likeness was duplicated in a huge balloon made by the Goodyear Tire & Rubber Company, the body being 34 feet long and 27 feet high. Frayed rope served for mane, whiskers and tail, and the body was a golden brown.

The entire animal was filled with helium and a special tent was erected at Chicago to house it during the convention. The balloon led the parade that was a feature of the convention with 14 uniformed attendants conducting it through the streets.

It was planned at the conclusion of the convention to send the balloon to various cities of the United States for inspection and publicity purposes.

MELFLEX PRODUCTS CO. TO MAKE RUBBER TREADS

The Melflex Products Company has been organized to manufacture a new type of safety tread for general use and will have headquarters at 1833 East Market street, Akron, O. Officers of the new firm are T. J. Mell, president, and L. E. Warford, vice-president and sales manager.

The new tread is light in weight, eliminates all trip and slipping hazards, and is made of cotton cords embedded in rubber. These treads are designed as safety devices for use in swimming pools, buses, bathrooms, shower rooms, around switch boards, entrances, aisles, and in industrial plants where safety foot comforts are always essential.

For work in underground electrical construction, the company is offering a safety pad to provide insulation for the employe. It has been tested at the Ohio Insulator Works and is able to withstand 100,000 volts of electricity.

Mr. Mell has been identified with the rubber industry at Akron for 35 years, and Mr. Warford is widely known in the field of rubber mats and treads. The Murdock Rubber Company will handle distribution for the Melflex products from Akron.

AKRON BALLOON CLUB IS FORMED BY GOODYEAR MEN

The Akron Balloon Club was organized on May 22 in the course of a meeting of Goodyear-Zeppelin Corporation men, the original purpose of which was to bid farewell to Knut Eckener, son of Dr. Hugo Eckener, Graf Zeppelin commander, who was to leave Akron a few days later on his way back to Friedrichshafen, Germany. Ward T. Van Orman, noted Goodyear balloonist, pointed out in a speech the auspiciousness of the time for the formation of a balloon club, and within a few minutes the 40 Goodyear-Zeppelin men present had been signed as charter members.

The club is to be open to all Akronites interested in ballooning and will operate on the same lines as the Detroit Balloon Club, at present the largest and most influential in the country. Three Goodyear balloons will be used by the club, and three others will be purchased from the United States Army. The Cleveland factory of the American Steel & Wire Company will serve as operations base because of the cheap available gas for the inflation of balloons.

Mr. Van Orman was chosen president of the club, and Lieutenant T. G. W. Settle, chief of the Navy inspection bureau at the Goodyear-Zeppelin plant, was named first vice-president. Frank White, president and founder of the Akron Glider Club, will act as second vice-president. Guy F. Feaster, assistant to Dr. Karl Arnstein, was elected secretary, and Karl Fickes, second in command of Goodyear lighter-than-air operations, was selected as treasurer. A flight committee was chosen, with Jack Boettner, chief Goodyear pilot, as chairman. Other members of the committee are Dr. Arnstein, Lieutenant R. G. Mayer, R. D. Wilson, J. F. Cooper, T. A. Knowles, and C. W. Seiberling, who is president of the local chapter of the National Aeronautic Association.

McGraw Rubber Plant Sold

The factory of the McGraw Rubber Company at East Palestine, O., which has been idle for two years, has been leased by Herbert Garrod of New Waterford, O., who intends to manufacture furniture in it for the wholesale trade. The McGraw Rubber Company formerly made small mechanical and household rubber goods, but was unable to meet the competition of larger companies in the industry.

GOODYEAR CONFERENCE FOR "MASTER" SALESMEN

Eighteen salesmen from as many countries spent two weeks in Akron last month attending the Goodyear Tire & Rubber Company's Master Salesmen Award Conference. The salesmen, all of whom had won individual selling contests promoted by the Goodyear export department last year, attended sales and product meetings, toured the company's factories, took airship rides and made a trip of inspection to the Detroit automobile plants.

Those who attended the conference were: C. A. Arroyo, Spain; C. R. Case, Mexico; F. Chapman, India; E. T. Costemalle, Argentina; E. Diez, Cuba; L. H. Simms, Australia; Guido Sturari, Brazil; D. T. Dillon, South Africa; C. A. Goldbert, Java; W. Missin, Sweden; O. Rickenback, Switzerland; R. Samson, France; A. Telmer, Denmark; D. Vlahoive, Chile; J. R. Torres, Porto Rico; W. H. Williams, England; T. Worthen, Philippine Islands, and R. Ziegenspeck, Germany.

Brown Instrument Offices

The Brown Instrument Company, Philadelphia, Pa., has consolidated its Chicago sales office and midwestern factory branch in new quarters located at 155 East Superior Street, Chicago, Ill. Nearly double the space formerly occupied by these offices has now been provided, and a large stock of replacement material is carried on hand for prompt shipment.

Mellon Institute to Build

The Mellon Institute of Industrial Research, Pittsburgh, Pa., will augment its present facilities by the construction of a seven-story laboratory, approximately 300 by 400 feet in size. In addition to adding more laboratory space, the structure will make possible an increase in the library from 11,000 to 250,000 volumes and greater development in all departments.

Pharis Names Ad Agency

The Pharis Tire & Rubber Company, Newark, O., has appointed the Robbins & Pearson Company, Columbus, O., to handle its advertising. The Pharis company completed a $350,000 expansion program early this year and now has an output of 5,300 tires daily.

CATALPO

for

Treads

Harold W. French

Harold W. French, a member of the Rubber Exchange of New York and president of the H. W. French Company, Inc., New York City, died on May 21 at his home in White Plains, N. Y. He was 52 years old at the time of his death.

Mr. French went to Akron in 1901 as representative of the New York Commercial Company, crude rubber dealers, and a short time later formed the firm of Gove & French, Inc., crude rubber brokers. Later, this corporation became French & Handy, Inc., when he became associated with J. L. Handy. In 1923, however, the firm became the H. W. French Company, Inc. Mr. French shifted his headquarters back to New York in 1914, but until a year ago maintained an office at Akron.

Ohio Rubber to Build

The Ohio Rubber Company, Willoughby O., is having plans prepared for a three-story factory building to cost approximately $400,000. The company, which was established in 1879, specializes in textile materials and mechanical rubber goods.

Goodrich Moves Boston Office

The Boston headquarters of the B. F. Goodrich Rubber Company have been moved to 109 Brookline Avenue, according to J. I. Wood, manager of footwear sales. The company's Boston headquarters were previously located at 614 Atlantic Avenue in that city.

Merge Rubber Ball Sales

The Paramount Sales Company, 16 East 18th Street, New York City, is now acting as sole selling agent for the entire output of Paramount, Goodyear, Rubbercraft and N. Y. Ball & Toy rubber balls and rubber toys. All four brands are made by the patented processes of the Paramount Rubber Company, Paterson, N. J.

Monsanto Earns $293,170

The net profits of the Monsanto Chemical Works for the quarter ended March 31 was $293,170 after charges and federal taxes, equivalent to 71 cents a share on 410,317 no-par shares of common stock. Due to the fact that the company has acquired the Rubber Service Laboratories Company and other new properties since the corresponding quarter of last year, no comparative figures are available.

Library Group to Meet

Members of the Commercial-Technical Group of the National Special Libraries Association, composed of the librarians of the leading public utility, transportation, advertising and industrial libraries, are planning an interesting program for the 22nd annual convention of that organization, to be held in San Francisco, Cal., from June 18 to 21. Reference guides will be discussed particularly, as will the subject of indexing trade publications not indexed elsewhere and the making of bibliographies.

AKRON BUYS AIRPORT LAND FROM GENERAL TIRE FIRM

The city of Akron on May 26 agreed to purchase 59.3 acres of land on the east side of Massilon Road from the General Tire & Rubber Company for the purpose of completing its 900-acre municipal airport. The price fixed is $1,000 an acre, and the General company will be given the privilege of leasing a hangar site at $1 a year and will pay the regular charges for operating on the field.

The General Tire & Rubber Company acquired the land in question several years ago from Otis Kreighbaum at a price of $1,000 an acre. At the time the corporation bought 70 acres of land, and the city of Akron has been negotiating for several months to secure the portion needed to round out its airport site.

One feature that was formerly reportel to have retarded the sale was the refusal of the Goodyear Tire & Rubber Company to sell the General company land and water rights along the Little Cuyahoga River. Some years ago Goodyear, under F. A. Seiberling, bought from M. O'Neil, then General Tire president, all of the land along the General Tire & Rubber Company property next to the river. As the two plants have grown in size, the value of this water for both has increased enormously, and the General Tire & Rubber Company has sought for some time to repurchase 15 or 20 acres of this land along with the water rights. The Goodyear Tire & Rubber Company, feeling that the value of the water to itself would be curtailed by its use up the river by the General factory, has refused to sell.

Rubber Stocks Go Higher

Rubber company securities closed the fortnight higher, but the trend at the end of the period was inclined to be downward in a stagnant market. Mohawk common was pushed up to a new high for the year, but General and Firestone preferred issues fell to new low levels. The prices of the leading rubber company shares on the various exchanges of the country on June 5 compare as follows:

	Last Price		High	Low
	June 4	May 20	—1930—	
Ajax	1½	1¾	2½	1⅜
Falls	—	—	4¾	3
Faultless	—	—	37	34⅜
Firestone	23¼	22	33¼	21⅝
do. 6% pfd.	77	—	87⅞	77
Fisk	3⅝	3¾	5½	3
do. 1st pfd.	13	13⅜	21	13
General	—	135	163	135
do. pfd.	—	—	91	88
Goodrich	40¼	40	58½	36
do. pfd.	—	—	104½	95⅝
Goodyear	86½	83	96⅞	62
do. 1st pfd.	—	—	102	90
India	—	20	25½	8½
Intercontinental	—	—	7½	4¼
Kelly Springfield	4⅛	4¼	6⅛	3¼
do. 6% pfd.	—	—	39	29
Lee	—	6¾	11	6¼
Mohawk	14	12½	15	8
do. pfd.	—	—	55	50
Norwalk	1¾	2	4	⅞
Pirelli	—	44¾	50⅞	44⅛
Raybestos-Manhattan	41¼	39	58⅞	33
Seiberling	8	8	18½	6⅛
do. pfd.	—	—	78	40
U. S. Rubber	30⅛	28	35	21⅛
do. pfd.	54	49½	63¾	47

Names in the News

DR. W. R. HUCKS, chief chemist of the Pacific Goodrich Rubber Company, spoke before the members of the Kiwanis Club of Fullerton, Cal., on May 12 on "The Romance of Rubber." He particularly outlined recent experiments with liquid latex.

EVERETT OLSON has been appointed manager of the compensation division of the Goodyear Tire & Rubber Company, succeeding Stanley Mansfield who resigned recently. A University of Illinois man, Mr. Olson began working for Goodyear last summer on the staff training group, following which he was transferred to the employees service division.

JAMES A. BRADEN, formerly associated with the Diamond Rubber Company, will describe the rubber industry of Akron in his latest novel, "Steve Holworth of the Olden Works," to be released late this summer by the Saalfield Publishing Company, Akron, O. The rubber strike of 1913 will play an important part in the new novel.

JOHN R. MURLIN, of the University of Rochester, spoke on June 5 before the members of the Akron Section of the American Chemical Society.

W. W. SMITH, manager of radio and dealer advertising for the Firestone Tire & Rubber Company, has resigned that post to become assistant manager of radio station WTAM at Cleveland, O. He had been with the Firestone organization in various advertising capacities for the last six years.

DR. FRANCIS E. LLOYD, professor of botany at McGill University, has furnished the Smithsonian Institution at Washington, D. C., with an elaborate set of hand-colored microscopic photographs of sections of bark of the Hevea rubber tree, showing the occurrence, distribution and origin of latex vessels and other features of the bark. The photographs were made from materials from the United States Rubber Company's plantations in Sumatra.

C. P. THOMAS has been appointed a member of a technical committee on thickness measurement of Committee E-1 on Methods of Testing of the American Society for Testing Materials. In this capacity, he is acting as a representative of Committee D-11 on Rubber Products.

COLONEL CLARENCE D. CHAMBERLIN, noted New York to Germany non-stop pilot, was a visitor to Akron on May 21, at which time he conferred with J. D. TEW, president of the B. F. Goodrich Company, and T. A. ASPELL, head of the aeronautical sales department.

F. G. SHERBONDY, treasurer of the Biggs Boiler Works, Akron, O., has been elected a member of the American Society for Testing Materials.

Harpham and Fickes Sail For Germany on Zeppelin

Fred M. Harpham, vice-president of the Goodyear Tire & Rubber Company, and Karl Fickes, assistant manager of airship operations for the Goodyear-Zeppelin Corporation, were among the passengers aboard the Graf Zeppelin on its homeward voyoge from Lakehurst, N. J., to Friedrichshafen, Germany. Mr. Harpham, who

F. M. HARPHAM

is also president of Akers & Harpham, prominent Akron contracting aud roofing concern, and a director of the Akron Chamber of Commerce, was invited to make the trip by Dr. Hugo Eckener, commander of the airship.

Mr. Fickes went as an ex-officio member of the crew to observe details of managing the craft. He will remain at the German airship works at Friedrichshafen for a time studying operations.

W. D. SHILTS, secretary of the Goodyear Tire & Rubber Company, completed 25 years of service with that organization last month. He was presented with a diamond pin and $250 in gold by President P. W. LITCHFIELD.

J. F. JONES, vice-president in charge of sales of the Mohawk Rubber Company, spent several days in San Francisco and other Pacific Coast cities last month, conferring with branch managers.

DR. HAROLD J. BENNETT joined the Fisk Rubber Company, Chicopee Falls, Mass., last month to take charge of its dental clinic, succeeding DR. WILLIAM E. MOORE, a classmate of his at Tufts Dental College, who resigned to enter private practice.

R. A. MCDONALD, district manager of the Fisk Tire Company, presided at a banquet and meeting of 25 Lorain County dealers held on May 26 at the Hotel Antlers, Lorain, O. A four-reel motion picture was shown, depicting the manufacture of a tire from plantation to finished product, and a one-act play illustrating sales problems was presented.

FRANCIS A. EMMONS, sales manager of Foote Brothers Gear & Machine Company, Chicago, Ill., has been elected vice-president in charge of gear division sales and advertising. He joined the company in 1924 as advertising manager and was appointed sales manager in 1926.

WILLIAM W. HIGGINS, sales manager of the United Carbon Company, has been on a business trip through the middle west, the Akron territory and the Pacific Coast, visiting rubber manufacturing companies. He states that conditions in the industry appear to be showing signs of returning to normalcy.

DR. HECTOR R. CARDETH, president of the Roessler & Hasslacher Chemical Company, has been elected a director of E. I. du Pont de Nemours & Company. DR. C. M. A. STINE, chemical director of the du Pont organization, has been appointed a member of its executive committee.

I. H. FLINN, foreman in the Goodyear Tire & Rubber Company plant at Gadsden, Ala., will replace E. KELLY as superintendent of Division A at the company's factory at Wolverhampton, England. Mr. Flinn, who has been associated with the Goodyear organization for 13 years, sailed for England on June 7.

J. S. BATHRICK, district sales manager of the Fisk Tire Company at Portland, Ore., presided at a dinner and sales meeting of 60 Fisk tire dealers at the Multnomah Hotel in that city on May 19. Together with other company officials, he addressed the dealers on the Fisk sales and advertising plans for the coming season.

WARD T. VAN ORMAN, pilot, and DR. WOLFGANG KLEMPERER, research engineer of the Goodyear-Zeppelin Corporation, and five student balloonists were flying in a free balloon near Cleveland Airport on the morning of May 20 when their craft narrowly missed a collision with an air mail plane, piloted by H. P. LITTLE.

H. D. CHENAULT, district manager of the Fisk Tire Company at Cincinnati, O., addressed a meeting of 150 Fisk dealers of the vicinity at the Gibson Hotel in that city on May 22. A motion picture illustrating the development of the rubber tire from crude materials to finished product was shown in connection with his talk.

Rubber News Around the World

PIRELLI PURCHASES LAND FOR BRAZILIAN FACTORY

The Pirelli Rubber Company, leading Italian rubber manufacturers, has acquired 200 square meters of land in the municipality of Sao Bernardo, Brazil, between the city of Sao Paulo anl the port of Santos, according to a recent bulletin from the commercial Bureau of the Brazilian Ministry of Foreign Affairs. Upon this site will be constructed a modernly equipped factory for the manufacture of automobile tires and various other classes of rubber goods.

This recent development confirms to some extent current reports to the effect that the Pirelli interests were anticipating the investment of $10,000,000 in various manufacturing enterprises in Brazil during the next five years. Count Pirelli stated his intention of opening a tire and cable factory near Sao Paulo in a speech in that city last October, declaring at the time that he would so far as possible employ native Brazilian labor and raw materials. His company already has branch factories in England, Spain and Argentina.

Australian Rapson Merger

The directors of the Rapson Tyre & Rubber Company (Australia), Ltd., have advised the Melbourne Stock Exchange that negotiations for the sale of the firm's plant and business to the Dunlop-Perdriau Rubber Company remain to be settled in detail only. The factory of the Rapson company is located in Tasmania.

April Golf Ball Imports

Imports of golf balls into the United States during April numbered 214,154, valued at $68,695, as compared with March imports of 182,668 balls, valued at $58,636. Golf balls imported in April, 1929, totaled 384,416, with a value of $118,174. The unit value per ball was 32.1 cents in April as compared to 32.1 cents in March and 33.7 cents in February. In all the months mentioned, all golf balls imported came from the United Kingdom.

Birmingham Technology Class

An evening course in rubber technology is being developed at the Aston Technical College, Birmingham, England, for the employes of the Dunlop Rubber Company, Ltd., and other rubber companies in that district. Such classes are to be tried out to determine the permanent demand for this type of work and will make it possible to decide whether a special section for rubber should be provided in the new Birmingham Central Technical College. It is expected that the courses in rubber technology at the Aston Technical College will start in September of this year.

Soviet Footwear Output Up

During the first half of the current fiscal year, the six months ended March 31, 1930, the volume of industrial production in large-scale enterprises under the supervision of the Soviet Supreme Economic Council showed heavy increases. The output of rubbers for the six months reached 25,389,000 pairs, as against 21,652,000 a year ago—an increase of 17.2 per cent. The Russian Five Year Plan for economic development had originally projected a gain of only 15.1 per cent.

Mandelberg Profits Lower

The 1929 report of J. Mandelberg & Company, one of the oldest and best known British waterproof garment manufacturing firms, shows the adverse effects of the abnormally dry periods experienced in the months when the firm's products are usually in greatest demand. Net profits for 1929, after depreciation, amounted to £77,243 for 1928. The dividend has been reduced from 10 to 8 per cent.

German Bunsen Society Meets

The 35th general meeting of the German Bunsen Society for Experimental Physical Chemistry (Deutsche Bunsen-Gesellschaft) was held at Heidelberg, Germany, from May 28 to June 1. Spectroscopy and the formation of molecules formed the principal subject for discussion at the sessions.

American Materials Are Used In French Rubber Factories

MUCH of the relative raw materials and appliances used in the French rubber industry are supplied by the United States, particularly carbon black and sulfur. With the exception of the crude rubber itself, most of the materials that go into the rubber manufactures of France probably have their source in this country.

Two-thirds of the French supply of crude rubber, balata, and gutta percha come from British India and Great Britain. Indo-China, in which Michelin and other French industrialists have developed plantations, furnished less of the raw material in 1929 than in 1927, the figures being, respectively 4,360 and 6,018 metric tons. The receipts from French Equatorial and French Occidental Africa have also declined, being only 9,833 metric tons in 1929, as compared with 19,182 metric tons in 1927. At the same time, the receipts of reclaimed and scrap rubber from the United States have tripled, the figures being 1,735 metric tons in 1927 and 5,739 metric tons in 1929.

The United States supplies 98 per cent of the carbon black imported into France, the figures for 1929 being 7,778.5 metric tons from the United States and 138.6 metric tons from other foreign sources. The total value of these imports was 34,774,000 francs ($1,383,294). Marking an increase of 28 per cent over the 5,959 metric tons received in 1927, these receipts are a further indication of the growth of the French rubber industry.

Sulfur Comes from United States

Sulfur comes mainly from the United States, Italy, and Spain, but it is employed in many other industries and the part taken by the rubber factories can not be segregated.

Mineral rubber or natural bitumen was received exclusively from the United States, until the discovery of a similar product was made at Pechelbronn, Alsace. The Alsatian substitute is now being extensively used in the French rubber industry, as it is less expensive than the imported material. The cost of the latter to the Paris importing agent is now $5.18 per 100 kilos, while the mineral rubber of Alsace is offered to the consumer at less than this amount. About 100 kilo tons of both products are consumed annually in French rubber manufacturing.

The United States is an important source of the anti-oxidants used in the industry. Zinc oxide is made in France.

Raw Materials More Expensive

It is said that the cost of raw materials is higher in France than in the United States. Crude rubber is assessed a 2 per cent turnover tax applicable to imports in general, and the fabric purchased from French textile mills is said to be more expensive than that obtained in the United States. As many of the accelerators are received from the United States, the cost is, of course, higher than in that country.

The greater number of machines used in the French rubber manufactures are of domestic production. A score or more of factories make these machines but the most important are Rapiquet and Olier. The former makes perfected types of mixing mills and vulcanizing presses, which undersell those of foreign origin. The best Banbury mixers come from an English house, which manufactures them under American patents. The bias cutters generally employed are produced by another English company, under patents of American origin. There are numerous miscellaneous machines of British make which command an important share of the French demand. French machines in general lack the finish of the English and American products.

Rubber Goods and Specialties

Faultless Zip-Strap Bath Cap

Under the name of Zip-Strap Bath Caps, the Faultless Rubber Company, Ashland, O., is offering a series of moulded-in-one-piece bathing caps with several unique features. The straps are all rubber, with no buckles, buttons or snaps to rust or break. By the use of special bronze colors, the caps are

artistically and permanently decorated in contrasting metallic hues that give the caps a radiant finish. The No. 100 style, illustrated here, embodies an original design in these metallic colors. The caps are packed individually in de luxe boxes.

Speed Play Buoy

To enable young children to play in safety on the water, the Fox Toy Company, Berea, O., is offering what is termed the Speed Play Buoy. Comprising a canoe-shaped frame, mounted on an especially designed and strengthened tire inner tube, it resembles an aquatic kiddie-car. The seat is suspended

from the frame with adjustable straps forming a cockpit, allowing the child free action of the arms and legs to paddle anywhere in perfect safety. All parts of the frame are covered with Duco, preventing it from rusting or disintegrating from the effects of salt water. The company is also making the Beach Buoy with a boat-shaped frame and special "Buoys" for adults.

Airubber Beach Mattress

In addition to its line of camp mattresses, the Airubber Department of the New York Rubber Corporation, Beacon, N. Y., is offering a series of completely rubber surfaced mattresses particularly adapted for use at the beach. These, according to the manufacturer, are strong, durable, and made to stand the wear and tear of sand and water. The mattresses are surfaced in a maroon color and are provided with brass grommets and life lines. The largest of the three sizes offered is 32 by 75 inches and weighs 12 pounds, while the smallest has a size of 26½ by 48 inches and weighs 6½ pounds. A medium size mattress is 75 inches long, 25 inches wide, and has a weight of 10¾ pounds.

Oak Whirlwind Balloon

Under the name of the Wirlwind print, the Oak Rubber Company, Ravenna, O., has introduced what promises to be a popular variation of the striped toy balloon. In this new print, the stripes are printed in three different bands around the balloon instead

of from top to neck as in its predecessors. The centre band of stripes is in a color different from that of the top and bottom band, giving the balloon a colorful appearance. The Wirlwind print is the third new item to be announced this season in the Oak line, following upon the Major Bubbles and the Onyx balloons.

Shoe Mud Guard

A guard of rubber, devised by E. L. Wilson, Wallington, England, is shaped to conform with the rear of the shoe upper and is provided with two flexible arms shaped to embrace the sides of the shoe and provided at their outer extremities with means such as lever clips for attaching the guard to the shoe upper. Stops are provided on the arms to prevent removal of the clips. In wear, the guard extends in a more or less horizontal direction.

Hood Comfort Toe Pattern

Canvas shoes of the line of the Hood Rubber Company, Inc., Watertown, Mass., subsidiary of the B. F. Goodrich Company, are now equipped with a new comfort toe pottern. Originally designed to prevent chafing and blistering, this pattern has been found to add wear and economy to the shoes

because it prevents dust, dirt, sand or water from sifting in around the toes to break stitches and fabric. In addition, there is said to be just as much lacing take-up in the comfort toe pattern as in the ordinory lace-to-toe style of canvas shoe.

Sponge Rubber Tire Core

A sponge rubber core of normally larger cross-section than the tire casing is compressed within the latter by means of a detachable rim-flange and transerse bolts, in a patent by J. R. Whitehouse, Epping, England. The core may be formed as a continuous ring, or in interlocking sections.

Swim-Toy Horse Float

A float that inflates to the form of a horse is a popular number in the line of Swim-Toys being offered by the Seamless Rubber Company, New Haven, Conn. This model

is equipped with a sand bag keel to keep it upright in the water when it is not being ridden. It has a length of 45 inches and is colored in an attractive gray with yellow trimmings to represent the saddle, bridle and mane. Swimmers of all ages are said to find in these floats opportunity for highly amusing and healthful exercise, and they are becoming popular at beaches and pools.

Current Crude Rubber Items

PRODUCERS OF PERAK ASK LEGISLATIVE AID

Asiatic rubber producers of Perak have adopted resolutions asking the government to take steps to stabilize the rubber industry, according to Singapore advices to the Rubber Exchange of New York.

Among the steps suggested by the producers were action by the government declaring Sunday a day of rest for all laborers in Malaya, legislation to prohibit the exports of second grade rubber and the granting of permission for the export only of smoked sheets and crepe.

The producers also suggested that the government call a conference of producers and officials to evolve a plan to save the industry from the effects of overproduction.

Exchange to Open Saturdays

Members of the Rubber Exchange of New York have voted to keep the exchange open for trading during all Saturdays in June, July and August, a proposal to close the exchange on those days failing to receive the necessary two-thirds majority in the balloting. The exchange was closed on Saturday, May 31, but members who had rubber to deliver or to receive were directed to keep their offices open for the completion of such deliveries. It is expected that the exchange will be similarly closed on Saturday, July 5.

Rubber Estates Merge

The Baru (Java) Estates and the Kalidjeroek Rubber Company are merging their interests in Dutch Borneo with those of the Rejang (Sarawak) Plantations in Sarawak. For this purpose the Tanoh Estates, Ltd., has been formed to take over the properties.

Native Rubber Report

A short report on native rubber cultivation in the Dutch East Indies by the Division of Agricultural Economics of the Department of Agriculture, Industry and Commerce in co-operation with the Central Bureau of Statistics, has been published in the *Korte Berichten voor Landbouw, Nijverheid en Handel* for April 4, 1930.

New Russian Rubber Plant

An expedition of the Institute of Central Asia has discovered a hitherto unknown rubber plant in the Samarkand district in Uzbekistan. This plant contains about 8 per cent of rubber and is found in large quantities in various regions of the republic. Its properties are now being studied with a view to the possibility of utilizing it in the rubber industry.

DUTCH RUBBER COMMITTEE PLANS MORE RESTRICTION

M. Burger, a prominent member of the Dutch Rubber Committee, interviewed in Amsterdam recently, stated that the task of the Committee's delegate, H. Marinus, who had just died suddenly in Batavia, was exclusively to try to obtain cooperation between European and native growers. The next step would be the holding of a meeting of a joint committee of British and Dutch producers in June to consider further measures, but a restriction to 80 per cent, as rumored, is out of the question.

Acording to Mr. Burger, the efforts of Mr. Marinus have won the support of the Governor-General of the Dutch East Indies and other local authorities, but it is rather doubtful whether the support of the small producers will be obtainable, it being to their interest to increase the output at decreasing prices in order to maintain their receipts.

BUD-GRAFTING SEEN AS RUINATION OF INDUSTRY

That bud-grafting, if generally practiced, will bring about such overproduction as to ruin the rubber plantation industry totally is the opinion of A. A. Baumann, chairman of the Kapar Para Rubber Estates Company. Speaking at the annual meeting of that company recently, Mr. Baumann stated, "My personal opinion is that if rubber bud-grafting contained half of what its authors predict the rubber trade would be absolutely ruined.

"We are producing too much rubber at the present time, and the advocates of bud-grafting tell us that in time we shall produce thousands of pounds to the acre. It seems, therefore, to me to be an insane policy.

"Thank goodness, I shall not live to see the full effect of bud-grafting, because I imagine it will not come to fruition for a great many years. I have seen the effect on the plantation rubber industry of the abolition of restriction, but I hope I shall not see it totally ruined by bud-grafting.

"We rubber growers are now painfully and laboriously climbing back to the restriction position from which we were ousted by the late government two years ago. The results of the policy of terminating the Stevenson restriction scheme may now be seen. The loss to the plantation industry generally must be something like £200,000,000 for the two years. I can not see who has benefited by it, and what I want is an explanation of why and wherefore it was done. I have always cherished the opinion that it was due to pressure from America. The American gentlemen did not like our control of rubber, and it seems to me that there is nothing which the government would not give up to America if she asked for it. I believe we would hand over the West Indies if the American government were to press us to do so."

At the instance of the Rubber Growers' Association and other bodies, the government of the Federated Malay States is understood to have agreed to revise the present export duties on crude rubber downward.

Closing Prices on Rubber Exchange of New York, Inc.

FROM MAY 19 TO JUNE 3, 1930

		Spot	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Sales
No. 1 Standard Contract of 10 Tons															
May	19	——	14.00	14.10	14.30	14.50	14.64	14.77	14.90	15.05	15.20	15.35	15.50	——	24
	20	——	13.90	13.90	14.18	14.37	14.52	14.66	14.80	14.90	15.00	15.10	15.20	——	31
	21	——	14.03	14.12	14.31	14.50	14.63	14.76	14.90	15.09	15.16	15.24	15.36	——	15
	22	——	14.12	14.20	14.37	14.55	14.69	14.83	14.97	15.16	15.24	15.32	15.40	——	—
	23	——	14.29	14.35	14.49	14.64	14.80	14.95	15.10	15.20	15.30	15.40	15.50	——	6
	24	——	14.35	14.40	14.57	14.75	14.89	15.02	15.15	15.27	15.38	15.50	15.62	——	5
	26	——	14.13	14.18	14.34	14.50	14.65	14.80	14.95	15.10	15.17	15.25	15.37	——	7
	27	——	14.18	14.23	14.37	14.52	14.67	14.82	14.97	15.05	15.15	15.25	15.35	——	10
	28	——	13.85	14.00	14.10	14.30	14.44	14.58	14.73	14.81	14.89	15.05	15.15	——	18
	29	——	13.95	14.10	14.25	14.40	14.56	14.71	14.87	14.96	15.06	15.15	15.25	——	9
June	2	——	13.60	13.70	13.85	14.01	14.14	14.27	14.40	14.55	14.70	14.85	15.00	15.15	45
	3	——	13.75	13.85	14.00	14.10	14.29	14.42	14.55	14.75	14.95	15.15	15.35	15.55	41
"A" Contract of 2½ Tons															
May	19	13.90	13.80	13.90	14.10	14.40	14.50	14.60	14.80	15.00	15.10	15.20	15.40	——	244
	20	13.80	13.80	13.80	14.00	14.20	14.40	14.50	14.60	14.70	14.80	14.90	15.00	——	180
	21	13.90	13.90	14.00	14.10	14.30	14.50	14.60	14.70	14.80	14.90	15.00	15.10	——	105
	22	14.00	13.90	14.00	14.20	14.40	14.60	14.70	14.80	14.90	15.00	15.10	15.20	——	29
	23	14.20	14.10	14.20	14.30	14.50	14.70	14.80	14.90	15.00	15.10	15.20	15.30	——	124
	24	14.20	14.10	14.20	14.30	14.50	14.70	14.80	14.90	15.00	15.10	15.20	15.30	——	31
	26	14.10	13.90	14.00	14.20	14.30	14.50	14.60	14.70	14.80	14.90	15.00	15.10	——	118
	27	14.00	13.80	14.00	14.10	14.30	14.50	14.60	14.70	14.80	14.90	15.00	15.10	——	63
	28	13.90	13.70	13.90	14.00	14.20	14.30	14.40	14.50	14.60	14.70	14.90	15.00	——	99
	29	14.00	13.70	13.90	14.10	14.30	14.50	14.60	14.70	14.80	14.90	15.00	15.10	——	135
June	2	13.60	13.40	13.50	13.60	13.80	14.00	14.10	14.20	14.30	14.40	14.60	14.80	14.90	107
	3	13.70	13.40	13.60	13.80	14.00	14.20	14.30	14.40	14.60	14.70	14.90	15.00	15.10	253

CATALPO
for
Frictions

U. S. TEST FLEET LEAVES ARIZONA FOR MICHIGAN

Having rounded out six months of operations on the sun-baked, gritty lava roads adjacent to Phoenix, Ariz., the tire test fleet of the United States Rubber Company left last month for Michigan where it will continue operations throughout the summer, returning to Arizona again next fall. More than 2,000,000 tire test miles had been piled up here since last November, when the fleet arrived, according to William Thompson, fleet manager, and hundreds of experimental tires shipped from the factory at Detroit had been put through tests ranging from a few hundred miles to many thousands.

The drivers' families each year accompany the cars to Phoenix in the fall, reside there during the winter, and return north with the fleet in the spring, living for the remainder of the year in Detroit, where e base of summer operations is at the United States tire plant, so that results may be studied close at hand.

The fleet consists of standard American makes of cars representing every weight and price range. Cars are replaced on an average of every twelve months, and at the time of their replacement will have had 100,000 miles or more on the speedometer, Mr. Thompson said.

Each car undergoes severe abuse at the rivers' hands, for where the motorist seeks ... get the most possible mileage out of his tires, the fleet operators aim to bring out any inherent defects in experimental tires in a minimum of time. Each car averages 360 speedometer miles a day, or 1,440 tire miles, and the fleet operates six days a week, 52 weeks a year. For fifteen years the United States Rubber Company has had fleets constantly on the road to test and prove the new tire features developed by the company's experimental engineers.

Government Specifications

The Federal Specifications Board is submitting to representative manufacturers a proposed revision of the federal specification for rubber fountain syringes and cloth-inserted fountain syringes. The board will send copies of these specifications to any firm interested and will be glad to receive any comment or suggestions as to changes which may be thought desirable. These comments should be sent to reach the board by June 20 to receive attention from the technical committee considering the subject.

CATALPO
for
Mechanicals

Falls Rubber Adds Workers

The Falls Rubber Company, Cuyahoga Falls, O., doubled its production during the month of April, and has added 100 men to its payroll since the first of the present month. The company now has a working force of 275, and its plant is in operation day and night.

Foote Brothers Name Agent

The Foote Brothers Gear & Machine Company, Chicago, Ill., has appointed the firm of Sutor & Company, 2008 East Slauson Avenue, Los Angeles, Cal., as representatives for its IXL speed reducers and gear products. The Los Angeles territory extends from the southern boundary of California up to a line drawn across the state just north of Bakersfield.

Fine Rubber Company Expands

The Fine Rubber Company, rubberizers of rainproof fabrics and manufacturers of raincoats and rubber surface clothing, have moved their Cambridge, Mass., raincoat plant to new and larger quarters at 28 Carleton street, Kendall Square, in that city. This additional space will give the firm triple its former production capacity. The rubberizing plant and main offices of the company are at Malden, Mass.

Plan New Carbon Black Plant

The Railroad Commission of Texas on April 7 took under advisement an application of the Texon Oil & Gas Company for a permit to establish a carbon black plant to use the residue gas from the company's deepest well on University of Texas land in Reagan County, Tex. The well is 8,527 feet deep and produces 3,000 barrels of oil and 10,000,000 cubic feet of gas daily.

Indiana Rubber Chicago Office

The Indiana Rubber & Insulated Wire Company, Jonesboro, Ind., has opened its new warehouse and offices, located at 620 West Jackson Boulevard, Chicago, Ill. The company has installed a complete stock of Paranite rubber covered and lead encased wires and cables, together with other products, to further efficient service to its Chicago trade. Frank R. Dolan has taken over the managership of the Chicago branch.

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ROESSLER & HASSLACHER CONDUCT ANNUAL OUTING

The third annual outing of the Roessler & Hasslacher Chemical Company was held at Narragansett Inn, Lindenhurst, L. I., on Saturday, May 24.

One hundred and sixty employees of the company attended and there was a very varied program, including a baseball game between the single and married men, running races and a tug-of-war. Luncheon and dinner was served and a short address was made by Milton Kutz, executive vice-president in charge of the New York office. Many members of the company attended from the Brooklyn warehouse and the branch offices.

The committee in charge was Miss R. Zundell, and Messrs. R. Schmidt, J. F. Schwarz, and W. Friesendorf.

Goodrich Accidents Reduced

The industrial accident rate of the B. F. Goodrich Company at Akron was reduced 58.08 per cent in the last six months of 1929, as compared with the first half of the same year, according to W. L. Schneider, safety director. The time loss as a result of accident was reduced 5,300 days. The plant has not had a fatal accident in 15 years.

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LATE MARKET PRICES

RUBBER—COTTONS AND FABRICS—CHEMICALS

NEW YORK, JUNE 4, 1930

RUBBER

Crude

ON JUNE 25, 1921, crude rubber sold on the New York market at 11½ cents a pound. In June, 1925, it sold at 75 cents a pound and in July, 1925, at $1.25 a pound. Thus far in June, 1930, rubber has sold down to 13⅜ cents a pound, and those in the trade are asking what the end will be.

The average of the daily closing prices at New York during May was 14.24 cents a pound, comparing with 14.98 cents in April and with 21.44 cents in May, 1929. This is the lowest average for a full month since August, 1922, when the figure was 13.93. The first three trading days in June have been below even the latter figure, and only a rally in the weeks to come will prevent the average for the current month from sinking under anything since 1921.

The higher rate of domestic consumption with a consequent reduction of stocks on hand at the end of May and the possibilities of further Anglo-Dutch restrictive measures are the only favorable features for the commodity.

Prices quoted on the New York outside market on June 4 were as follows:

Plantations—

Ribbed Smoked Sheets—			
Spot-June		.13⅛@	.13⅜
July		.13⅛@	.13⅛
July-Sept.		.13⅛@	.13⅜
First Latex, crepe spot		.13¼@	.13¼
Amber Crepe, No. 2		.13 @	.13⅜
Amber Crepe, No. 3		.12⅞@	.13⅛
Amber Crepe, No. 4		.12⅝@	.12⅞
Brown Crepe, Clean thin		.12¾@	.13
Brown Crepe, specky		.12⅝@	.12⅝
Liquid Latex, per gal.		.90 @	1.25

Paras—

Up-river Fine		.15 @	.15¼
Up-river Medium		Nominal	
Up-river Coarse		.07 @	.07⅛
Acre Bolivian, fine		.15⅝@	.15⅝
Caucho Ball, Upper		.07 @	.07¼
Islands, fine		Nominal	

Centrals—

Central, scrap		.07 @	.07¼
Esmeraldas		.07 @	.07¼

Balata—

Block, Colombia		Nominal	
Block, Ciudad		.43 @	.44

LONDON MARKET

Standard Ribbed Smoked Sheets—Buyers			
Spot-June		@	6⅝d
July-Sept.		6⅝@	6¾d

SINGAPORE MARKET

Standard Ribbed Smoked Sheets—Sellers			
Spot		@	6⅝d

Scrap

Activity has continued in the scrap rubber market, due to the increase in domestic production and consumption of reclaimed rubber. Prices are lower, however, and closed the fortnight as follows:

(Prices to Consumer)

Auto tire peelings	ton	27.50	@30.00
Standard White auto	ton	40.00	@42.50
Mixed auto	ton	17.50	@19.00
Bicycle tires	ton	15.00	@17.00
Clean solid truck tires	ton	24.50	@25.00
Boots and shoes	cwt.	1.38	@ 1.40
Arctics, untrimmed	lb.	.00⅝@	.01
Inner tubes, No. 1	lb.	.07 @	.07¼
Inner tubes, No. 2, compounded	lb.	.03⅝@	.03¾
Inner Tubes, Red	lb.	.03⅝@	.03¾
Air Brake Hose	ton	17.50	@20.00
Rubber Hose	ton	17.50	@20.00

Reclaimed

While consumption of reclaimed rubber gained during May, the amount consumed in proportion to the domestic crude rubber consumption is believed to be even lower than usual. With crude rubber at the lowest levels in nine years, the demand for reclaim is naturally below the levels that prevail when crude is high in price. Late prices for the various grades of reclaimed rubber were as follows:

High Tensile

Super-Reclaim No. 1 Black	lb.	.10¾@	.11
High Tensile Red	lb.	.10½@	.10⅝

Shoe

Unwashed	lb.	.06¾@	.07
Washed	lb.	.09 @	.09¼

Tube

No. 1 (Floating)	lb.	.11½@	.12
No. 2 (Compounded)	lb.	.08¾@	.09

Tires

Black	lb.	.06¾@	.07
Black, selected tires	lb.	.07 @	.07¼
Dark Gray	lb.	.08 @	.08½
Light Gray	lb.	.09¼@	.09½
White	lb.	.11 @	.11¾
Truck, Heavy Gravity	lb.	.06¾@	.07
Truck, Light Gravity	lb.	.07 @	.07¼

Miscellaneous

Mechanical blends	lb.	.05 @	.05½
Red	lb.	.10½@	.11

COTTON and FABRICS

Cotton

COTTON, which for some weeks had shown more resistance to the current depression than other commodities, finally succumbed to the bear element and dropped below the 16-cent level on June 4. The average of the daily closing prices for spot middling upland cotton during May was 16.43 cents a pound, comparing with 16.39 cents in April and with 19.41 cents in May, 1929.

Domestic consumption has been lower this year, exports are less, stocks are higher, and unfavorable foreign sentiment toward American cotton is being created by the Hawley-Smoot tariff rates against long staple cotton imported into this country from abroad. There are signs of improvement in the domestic textile trade, however, and the 1930 crop may not come up to previous expectations.

The high, low and closing prices on the New York Cotton Exchange on June 4 were as follows:

	High	Low	Close	Close
		June 4		May 20
July	15.88	15.76	15.79	16.30
Oct.	14.58	14.22	14.24	15.16
Dec.	14.45	14.30	14.30	——

Tire Fabrics

The latest prices for tire fabrics, showing slight declines, were as follows:

CORD

Peeler, carded, 23/5/3	lb.	.42½@	.42½
Peeler, carded, 23/4/3	lb.	.44⅝@	.45
Peeler, carded, 13/3/3	lb.	.38½@	.39
Peeler, carded, 15/3/3	lb.	.39½@	.40
Egyptian, carded, 23/5/3	lb.	.48¼@	.48½
Egyptian, combed, 23/5/3	lb.	.53 @	.53½

CHAFERS

Carded, American, 8 oz.	lb.	.36½@	.37
Carded, American, 10 oz.	lb.	.37½@	.38
Carded, American, 12 oz.	lb.	.36 @	.37
Carded, American, 14 oz.	lb.	.35 @	.40

LENO BREAKER

Carded, American, 8¼ oz.	lb.	.37 @	.41
Carded, American, 10¼ oz.	lb.	.37 @	.41

SQUARE WOVEN

Carded, American, 17¼ oz. 23-11 ply	lb.	.42½@	.43
Carded, American, 17¼ oz. 10-ply	lb.	.35 @	.35½

Sheetings

Prices on sheetings remained practically stable during the fortnight. Late prices quoted by the Textile Brokers Association follow:

40-inch, 2.50-yard	yd.	— @	.10¼
40-inch, 2.85-yard	yd.	.09 @	.09¼
40-inch, 3.15-yard	yd.	.09⅞@	.10
40-inch, 3.60-yard	yd.	— @	.09½
40-inch, 3.75-yard	yd.	— @	.07¼
40-inch, 4.25-yard	yd.	— @	.06¼

Ducks

There have been no changes in price on the cotton duck market during the past two weeks. The price quotations for the active grades remain as follows:

Belting and Hose	lb.	.33 @	.34
Enameling	lb.	.32 @	.32½
Single filling	lb.	.14 @	.14½
Double filling	lb.	— @	.16

CHEMICALS

SHOULD the increased rate of factory production that prevailed during May continue into the coming warm months, suppliers of chemicals and compounding materials to the rubber industry will have no cause to complain. Consumption of all type of rubber chemicals and compounding ingredients went forward at a high rate last month. Carbon black, however, was still moving in the spotty, sporadic manner that has featured it for some time, with tire manufacturers content to buy for needs only. But despite the comparative dullness, the New York *Journal of Commerce* says, "Prices showed no inclination to move into lower ground, Texas gas continuing to quote 5 cents a pound for carlots at the works and Louisiana gas 5.1 at the works."

ACCELERATORS

Organic

A-1	lb.	.24	@	.27
A-5-10	lb.	.33	@	.36
A-7	lb.	.55	@	.59
A-11	lb.	.62	@	.66
A-16	lb.	.57	@	.61
A-19	lb.	.58	@	.62
A-20	lb.	.64	@	.68
A-32	lb.	.90	@	.95
Aldehyde ammonia, crystals	lb.	.65	@	.70
Aniline oil, drums, f.o.b. works	lb.	.15	@	.16
Captax	lb.			
Crylene	lb.	.55	@	.65
paste	lb.	.45	@	.55
Di-Ortho-Tolyguanidine	lb.	.42	@	.44½
Diphenylguanidine	lb.	.30	@	.32½
Dipsol	lb.	4.30	@	4.50
Ethylidene aniline	lb.	.45	@	.47½
Formaldehyde aniline	lb.	.40	@	.42½
Heptene	lb.	.40	@	—
Hexamethylene-tetramine	lb.	.58½	@	.61
Lithex	lb.	.18	@	.20
Methylenedianiline	lb.	.37½	@	.40
Monex	lb.	3.25	@	—
Oxynone	lb.	.68	@	.80
Phenex	lb.	.75	@	—
R & H 40	lb.	.40	@	.42½
R & H 50	lb.	.40	@	.42½
R & H 397	lb.	.75	@	.77½
R-2	lb.	1.95	@	2.15
Safex	lb.	1.20	@	1.25
SPDX	lb.	.75	@	—
Super-Sulphur No. 1	lb.			
No. 2	lb.			
Tensilac, No. 39	lb.	.40	@	.42½
Tensilac, No. 41	lb.	.50	@	.52½
Thermic F	lb.	.50	@	.55
Thiocarbanilid, drums	lb.	.25½	@	.28½
Trimene	lb.	.75	@	—
base	lb.	1.20	@	—
Triphenylguanidine	lb.	.58	@	.62½
Tuads	lb.			
Ureka	lb.	.75	@	1.00
Vulcanex	lb.			
Vulcone	lb.			
Vulcanol	lb.			
Z 88	lb.	.50	@	.60
Zimate	lb.			

Inorganic

Lead, sublimed blue	lb.	.08¼	@	—
Lead, white	lb.	.08½	@	.08¾
Litharge, domestic	lb.	—	@	.08¼
Magnesia, calcined, light	per 100 lb.	5.35	@	5.45
heavy	per 100 lb.	3.65	@	3.75

COLORS

Blacks (See Compounding Materials)

Blues

Prussian	lb.	.35	@	.36
Ultramarine	lb.	.06	@	.32

Browns

Sienna, Italian	lb.	.05¼	@	.12½
Umber, Turkey	lb.	.04½	@	.07

Greens

Chrome, light	lb.	.30	@	.32
medium	lb.	.31	@	.33
dark	lb.	.34	@	.36
Chromium Oxide, bbl.	lb.	.34½	@	.35½

Reds

Antimony crimson, 15/17	lb.	.40	@	.44
sulfur, free	lb.	.56	@	.66
golden 15/17 F.S.	lb.	.20	@	.25
Indian English	lb.	.08	@	.11
Domestic (Maroon)	lb.	.11	@	—
Oximony	lb.	.13¼	@	—
Red oxide, pure	lb.	.10	@	.12
Venetian red	lb.	.03	@	.06
Vermillion, quicksilver, English	lb.	1.75	@	1.80

Whites

Lithopone, Akcolith	lb.	.05 3/5	@	.06
Lithopone, Albalith	lb.	.05¼	@	.05¾
Lithopone, Azolith	lb.	.05¼	@	.05¾
Lithopone, Vanolith	lb.	.05¾	@	—
Titanox B, f.o.b. St. Louis, lb.		.07¼	@	.07¾
Titanox C, f.o.b. St. Louis, lb.		.07¾	@	.08¼

Zinc Oxide—American Process

American Azo: ZZZ (lead free)	lb.	.06½	@	.07
ZZ (leaded)	lb.	.06⅝	@	.06⅞
Horsehead Brand: Special	lb.	.07	@	.07½
XX Green	lb.	.07	@	.07½
XX Red, lead free	lb.	.06½	@	.07
Kadox, black label	lb.	.10⅜	@	.10⅞
blue label	lb.	.09⅜	@	.09⅞
red label	lb.	.08	@	.08½

Zinc Oxide—French Process

White seal	lb.	.11⅝	@	.11⅞
Green seal	lb.	.10⅝	@	.10⅞
Red seal	lb.	.09⅝	@	.09⅞

Yellows

Chrome	lb.	.17	@	.17½
Ocher, French medium	lb.	.02	@	.03
domestic	lb.	.01⅝	@	.02

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85	@	24.50
Ammonia carbonate, lump	lb.	.07½	@	.07¾
Asbestine	ton	14.75	@	18.00
Barium carbonate	lb.	.03½	@	.05
Barium Dust	lb.	.05	@	.06
Barytes southern off-color	ton	12.00	@	18.00
Western prime white	ton	23.00	@	—
imported	ton	27.00	@	36.00
Basofor	lb.	.04½	@	—

Blacks

Arrow "Aerfloted"	lb.	.05½	@	.11
Bone Black	lb.	.07	@	.08½
Carbon, compressed	lb.	.05	@	.10
Carbon, uncompressed	lb.	.05	@	.10
Disperso, f.o.b. Louisiana	lb.	.051	@	—
Disperso, f.o.b. Texas	lb.	.05	@	—
Drop Black	lb.	.06	@	.14
Fumonex	lb.	.04½	@	.08
Excello, compressed	lb.	.05	@	.09
Gastex, f.o.b. Texas	lb.	.04¼	@	.05½
Lamp Black	lb.	.10	@	.40
Micronex	lb.	.05½	@	.11
Thermatomic-Thermax	lb.			
Flex	lb.			
P-33	lb.			
United carbon, fob Tex.	lb.	.05½	@	.11
Velvetex carbon	lb.	.04	@	.06
Blanc fixe dry f.o.b. works	ton	75.00	@	90.00
Carrara filler	lb.	01¾	@	.02
Catalpo (fact.)	lb.	.02	@	—
Clay, China, domestic	ton	8.00	@	9.00
Aerfloted Suprex	ton	10.00	@	22.00
Congaree, c. l. f.o.b. mine	ton	9.00	@	—
Dark Blue Ridge	ton			
Dixie	ton			
Langford	ton			
Lexington	ton	10.00	@	22.00
Mineral Flour, c. l. fob mine	ton	20.00	@	23.00
Par	ton			
Tensulite		15.00	@	—
Glues, extra white	lb.	.22	@	.26
medium white	lb.	.20	@	.24
Magnesia, carbonate	lb.	.08¾	@	.11
Mica, white water grnd.	lb.	.06	@	.08
Off color (biotite)	lb.	.05	@	.07
Rotten Stone powdered)	lb.	.02	@	.05
Soapstone, powdered	ton	15.00	@	22.00
Starch, powdered	cwt.	3.72	@	4.02
Talc, domestic	ton	12.00	@	15.00
Pyrax A	ton			
Whiting, commercial	cwt.	—	@	1.00
English cliffstone	cwt.	1.75	@	2.00
Quaker	ton			
Superfine	ton	10.00	@	12.00
Sussex	ton			
Witco	ton	20.00	@	—
Zinc Carbonate	lb.	.09½	@	.10½
Zinc Stearate	lb.	.23	@	.24½

MINERAL RUBBER

Genasco (factory)	ton	50.00	@	52.00
Granulated M. R.	ton			
Hard Hydrocarbon	ton			
Paradura	ton	62.50	@	65.00
Pioneer, MR, solid	ton	40.00	@	42.00
Pioneer-granulated	ton	50.00	@	52.00
R & H Hydro-Carbon	ton	27.05	@	29.00
Robertson, MR, solid	ton	34.00	@	80.00
M.R. (gran)	ton	38.00	@	80.00

SOFTENERS

Acids

Nitric, 36 degrees	cwt.	5.00	@	5.25
Sulfuric, 66°	cwt.	1.60	@	1.96
Tartaric, crystals	lb.	.38	@	.38½

Acids, Fatty

Laurex	lb.	.15	@	.16
Stearex	lb.	.18	@	.19
Stearic, double pressed	lb.	.17	@	.22

Alkalies

Caustic soda, 76%	cwt.	3.76	@	3.91
Soda ash, 58% C.L.	cwt.	1.40	@	

Oils

Corn, refined, bbls.	lb.	.09	@	.10¼
Cottonseed, crude		—	@	.07⅝
Cycline	gal.	.27	@	.34
Degras (c.l. 100 bbls.)	lb.	.03¾	@	—
Less c. l. (10-25 bbls.)	lb.	.04	@	—
Lots less than 10 bbls.	lb.	.04¼	@	.04¼
Fluxrite	lb.	.05½	@	.06½
Palm Lagos	lb.	.07⅜	@	.07½
Niger	lb.	—	@	.07¼
Para-Flux	gal.	.17	@	—
Petrolatum, white	lb.	.08	@	.08½
Pigmentaroil	gal.	.31	@	.36
Pine, steam distilled	gal.	.65	@	.70
destructively distilled	gal.	.55	@	.58
Witco Palm Oil	lb.	.11	@	—
Witco Softener (f.o.b. wks.)	lb.	.02	@	—

Resins and Pitches

Pitch, Burgundy	lb.	.06½	@	.07½
coal tar	gal.	.05½	@	.06
pine, 200 lb. gr. wt.	bbl.	9.00	@	10.00
Rosin, grade K, 280 lb.	bbl.	—	@	7.10
Pigmentar	lb.	.038	@	.0446
Tar Retort, 50 gal.	bbl.	13.50	@	15.00

Solvents

Acetone, pure	lb.	.11	@	.12
Alcohol denatured, No. 1 bbls.	gal.	.43	@	.45
Benzol, 90%	gal.	.21	@	.23
Carbon bisulphide	lb.	.05½	@	.06¼
Carbon tetrachloride	lb.	.06¼	@	.07
Dryolene (f.o.b. Okla.)	gal.	.10	@	.10½
Gasoline, steel bbls.	gal.	.16	@	—
Naptha, solvent	gal.	.35	@	.40
Rub-Sol (f.o.b .Okla.)	gal.	.09	@	—
Turpentine, spirits	gal.	.51	@	.67
wood	gal.	—	@	.49
destructively distilled	gal.	.40	@	.43

Waxes

Beeswax, white	lb.	.51	@	.53
Carnauba	lb.	—	@	.54
Ceresin, white	lb.	.10	@	.11
Montan, crude	lb.	.06½	@	.07
Ozokerite, black	lb.	.24	@	.25
green	lb.	.26	@	.30

Paraffin (c. l.—f.o.b. N. Y.)

Yellow crude scale	lb.	.03¼	@	—
White crude scale 124/126	lb.	.03½	@	—
Refined, 125/127	lb.	.04¼	@	—
Refined, 128/130	lb.	.04½	@	—
Refined, 135/137	lb.	.05¾	@	—
Refined, 138/140	lb.	.07¾	@	—

ANTI-OXIDANTS

Agerite, Resin	lb.			
Powder	lb.			
White	lb.			
Albasan	lb.	.70	@	.75
Antox	lb.			
B-L-E	lb.	.57	@	.60
Neozone	lb.			
Oxynone	lb.	.68	@	.80
Resistox	lb.	.54	@	.57
Stabilite	lb.	.57	@	.62
Stabilite Alba	lb.	.70	@	.75
VGB	lb.	.55	@	.66

SPECIALTIES

Sunproof	lb.	.35	@	.37½
Tonox	lb.	.56	@	.60

SUBSTITUTES

Black	lb.	.08	@	.14
White	lb.	.10	@	.16
Brown	lb.	.08	@	.15

VULCANIZING INGREDIENTS

Sulfur Chloride (drums)	lb.	.03½	@	.04½
Sulfur flour, Ref'n'd, 100% pure (bags)	cwt.	2.40	@	2.75
Commercial (bags)	cwt.	1.75	@	2.10
Vandex	lb.			

TIRES & TUBES
CRUDE RUBBER

STATISTICAL SECTION

AUTOMOBILES
GASOLINE

MALAYAN exports reported for the month of May at 49,039 long tons were considerably higher than had been expected, particularly in view of the tapping stoppage during that period. It is believed, however, that American consumption in May exceeded net imports for the first time since last September.

World stocks will probably show a moderate reduction as of May 31 due to the tapping cessation and to the increased rate of consumption in the United States. London and Liverpool stocks, however, have continued to expand and totaled 102,724 long tons on May 31 as compared with 101,380 long tons on May 17.

PLAN OF THE SECTION

The statistics included in this section have been chosen for their constant importance to the rubber industry. The tables are reprinted in the same relative position in every issue, each table being kept current by the addition of new figures as soon as they become available.

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The Department of Commerce weighted index of the domestic rubber tire industry dropped to 105 in March as compared with 107 in both January and February and with 152 in March, 1929. The index of employment in the domestic rubber products industry declined to 87 in March as against 88 in February and 113 in March, 1929. These figures will undoubtedly show a sharp advance for April and May.

Latest figures covering imports and exports from leading producing and consuming countries have been added to the appropriate tables in this section.

U. S. Imports and Exports of Crude Rubber

	Gross Imports			Re-exports			Net Imports
YEARS	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons
1921	185,394	73,772,677	17.76	5,716	2,414,924	19.86	179,678
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,259	339,874,774	35.60	27,775	24,795,488	39.76	398,483
1928	439,731	244,854,973	25.08	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,723	20.64	523,599
1927:							
July	37,677	31,678,259	37.53	1,958	1,560,853	35.59	35,719
Aug.	32,810	26,396,931	35.92	1,809	1,382,768	34.12	31,001
Sept.	33,301	25,314,412	33.94	3,500	3,036,929	38.74	29,801
Oct.	30,184	22,163,282	32.78	2,513	2,042,713	36.29	27,671
Nov.	28,592	27,395,428	31.69	2,469	2,014,196	36.43	26,123
Dec.	30,737	22,213,574	32.26	2,655	2,245,754	37.77	28,082
1928:							
Jan.	39,197	30,278,444	34.56	1,988	1,734,990	38.95	37,119
Feb.	33,663	27,763,655	36.82	2,738	2,229,589	36.35	30,925
Mar.	40,611	32,103,042	35.29	3,718	2,587,435	31.07	36,893
Apr.	37,935	27,287,266	32.11	2,272	1,415,024	27.80	35,663
May	31,059	19,058,672	27.39	2,399	1,386,307	25.80	28,660
June	27,765	14,121,219	22.71	2,621	1,400,697	23.86	25,144
July	31,258	14,144,765	20.20	3,087	1,451,446	20.99	28,171
Aug.	31,204	12,860,150	18.39	2,377	1,084,646	20.37	28,827
Sept.	39,235	16,512,019	18.50	3,038	1,384,148	20.34	36,797
Oct.	44,059	18,200,332	18.44	2,405	1,085,407	20.15	41,653
Nov.	36,519	14,875,441	18.19	2,788	1,207,089	18.52	33,731
Dec.	43,511	17,580,966	18.04	2,738	1,165,743	19.00	40,773
1929:							
Jan.	57,564	22,872,943	17.74	3,663	1,773,401	21.61	53,901
Feb.	64,265	24,760,111	17.20	2,955	1,374,783	20.77	61,310
Mar.	50,604	20,330,905	17.98	4,218	2,094,037	22.16	46,386
Apr.	55,725	25,542,726	20.46	3,293	1,624,237	22.02	52,432
May	51,161	24,355,511	21.25	2,836	1,349,690	21.24	48,325
June	41,663	18,799,307	20.14	3,152	1,470,746	20.83	38,511
July	43,944	19,342,147	19.65	3,424	1,590,411	20.75	40,520
Aug.	37,222	16,530,090	19.83	2,644	1,232,217	20.80	34,578
Sept.	34,472	15,214,485	19.70	2,011	861,068	19.11	32,461
Oct.	38,163	16,192,261	18.94	2,614	1,190,510	20.33	35,549
Nov.	43,507	18,189,305	18.66	2,929	1,300,354	19.82	40,578
Dec.	42,952	17,573,330	18.27	2,745	1,007,279	16.38	40,207
1930:							
Jan.	47,496	17,793,563	16.72	3,144	1,077,415	15.30	44,352
Feb.	42,687	14,798,240	15.48	2,280	960,790	18.80	40,407
Mar.	44,976	14,653,243	14.54	3,187	1,192,708	16.71	41,789
Apr.	45,423	14,783,605	14.53	2,688	892,532	14.82	42,735
May							
June							

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1923	1924	1925	1926	1927	1928	1929	1930
Jan.	30,106	29,058	29,638	32,196	31,518	34,403	43,002	36,669
Feb.	30,149	25,736	29,761	31,136	30,137	33,702	41,594	32,726
Mar.	36,629	28,385	33,498	32,936	36,141	35,688	44,730	35,914
Apr.	29,085	27,129	34,139	32,696	35,871	32,772	47,521	40,207
May	36,155	25,845	35,322	29,364	34,592	37,333	49,233	
June	24,272	22,753	35,822	28,598	33,801	37,676	43,227	
July	17,685	23,396	36,053	27,577	29,219	37,407	41,526	
Aug.	20,359	28,982	35,909	34,533	33,460	42,927	38,274	
Sept.	17,594	31,497	31,691	32,904	27,214	39,882	34,707	
Oct.	21,321	31,520	29,047	29,836	26,790	40,857	34,800	
Nov.	20,437	27,289	28,853	28,080	26,792	37,461	27,659	
Dec.	31,902	27,199	28,748	26,293	25,492	31,232	23,531	
Totals	305,694	328,769	388,481	366,149	371,027	441,340	469,804	

Figures on Quarterly Basis

Quarter	1922	1923	1924	1925	1926	1927	1928	1929
Jan./Mar.		96,776	87,609	95,263	94,301	99,216	103,558	128,545
Apr./June	127,360	89,493	75,674	104,099	87,109	103,242	103,500	139,298
July/Sept.		55,621	83,813	99,493	93,793	89,210	117,573	113,746
Oct./Dec.	155,067	63,617	92,656	85,789	83,212	80,860	117,597	84,872
Totals	282,427	305,507	339,752	384,644	358,415	372,528	442,227	466,475

Note—The Rubber Association estimates its monthly rubber consumption figures to be 90 per cent complete. Up until 1925 the quarterly figures were likewise estimated to be 90 per cent complete; beginning with 1925 an estimate of 92 per cent completeness has been used. These estimates have been used in raising the figures in this table to 100 per cent. The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Rubber Invoiced to the U. S.

(Reported by American Consuls—Quantities in Long Tons)

During the Week Ended	From Br. Malaya	From Ceylon	From Dutch East Indies	From London & Liverpool	Total
Mar. 8	6,637	925	1,990	45	9,597
Mar. 15	6,256	658	1,786	10	8,710
Mar. 22	7,075	753	1,997	19	9,844
Mar. 29	5,867	1,335	1,462	—	8,664
Apr. 5	7,435	779	2,109	—	10,323
Apr. 12	7,026	1,235	1,527	7	9,795
Apr. 19	6,013	493	1,109	21	7,636
Apr. 26	5,558	642	1,224	—	7,424
May 3	7,703	1,384	1,806	25	10,918
May 10	6,863	891	1,271	11	9,036
May 17	8,359	650	1,874	30	10,913
May 24	6,041	741	1,500	162	8,444
May 31	6,532	738	1,746	54	9,070

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1925																																
February	87½	87¾	87¾	87¾	—	86¾	87	86¾	84½	83¾	83⅞	—	82½	82¼	81¾	81¼	81¼	81¼	—	80⅝	28¾	—	26¼	28½	—	—	—	29	29¼	—	—	82¾
March	29	28⅞	28⅞	—	29	28¾	26¾	25½	25¼	—	24¼	24¾	25½	25	25¼	25¼	25¼	25¼	28⅝	26¾	26¾	26⅝	27¾	27¾	—	26⅞	27¼	27¾	27¾	—	27¾	26¾
April	27¼	27½	27½	21⅜	21¼	—	—	—	20	—	18⅜	18⅜	18⅜	19	19	19	17¾	17¾	17¾	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	—	19
May	17½	17¾	18¼	19½	19¾	—	18¾	19¾	19¾	—	19¾	19¾	19½	19¾	19¾	19¾	19¾	18¾	19¾	19¾	19¾	19¾	20¼	20¼	—	20¼	19¾	—	—	19¾	—	19½
June	19¾	19¾	—	19¾	19¾	19¾	19¾	19¾	19¾	—	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	20	19¾	19¾	19¾	19¾	19¾	19¾	19½
July	19¾	18⅞	18⅞	—	19	19	—	20	20	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19½
August	19½	19½	19¾	19¾	—	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19½
September	—	—	—	19	18¾	18¾	18¾	18¾	18¾	17¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18½	18½	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼
October	18⅝	18½	18½	18¾	18¾	18¾	—	18¾	18¾	18¾	19	—	18¼	18¼	18	18	17¾	17¾	18	18	18	18	18	18	18	18	18	18	18	18	18	18
November	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
December	17¾	—	17¾	17¾	17¾	18¼	18	18	—	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
1929																																
January	—	18¼	18¼	18¼	18¼	—	18¼	18⅜	18½	18⅝	20	20	—	20	19¾	20⅜	20¼	20¼	20¼	—	20⅜	20½	21¾	22⅝	22¼	22¼	21¾	21¾	21¾	22¼	22¼	20¼
February	22¾	22	—	—	22¾	22¾	22¾	22¾	22¾	—	22¾	22¾	23	23	25¾	25⅝	25¾	25¾	25¾	25	23	23½	—	23¾	23¾	23¾	23¾	23¾	23¾	—	—	24
March	26	26	—	21¾	25	26	25¾	25½	25½	25¾	25¾	25¾	25¾	24¾	24¾	24¾	24¾	24¾	24¾	23	—	—	20¾	24¾	24¾	24¾	24¾	24¾	24¾	24¾	—	24½
April	23	23¼	22¼	22¾	22½	22½	22¾	22¾	22¾	22¾	22¾	21¾	21¾	21¾	21¾	21¾	21	20	19¾	19¾	—	19¾	20¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	21¾
May	19¾	19¾	19¾	19¾	19¾	20¾	20¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	22¾	22¾	23¾	23½	22¾	22¾	22¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21½
June	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	21	21	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾
July	20¾	21¼	21¼	—	21	21	21	22¾	22¾	21¾	22	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾
Aug.	21¾	21	21	—	21	21	21	21	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾
Sept.	—	20¼	20¼	20¼	20¼	20¼	—	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾	20¾
Oct.	19⅝	19½	19½	19⅝	19⅝	—	17	17¾	16¾	—	16½	16¾	16¾	16¾	16¾	16¾	17	16¾	16¾	16¾	16¾	16¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	18¾	19¾
Nov.	17¾	17¾	17¾	17¾	17¾	18¼	18	18	—	18	18	18¼	18¼	18¼	18	18	17¾	18	18	18	18	18	18	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¼	18¾
Dec.	—	16¼	16¼	16¼	16¼	16¼	16¼	16¼	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾	16¾
1930																																
January	—	16¾	16¾	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15¼	15¼	15¼	15¼
February	15¼	—	—	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	—	15⅝
March	15⅜	—	15½	15⅜	15⅜	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼	15¼
April	15½	15¾	15⅜	15¼	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾	14¾
May	14¾	14⅝	14⅝	—	13⅜	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
June	—	13¾	13⅞	13⅜	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1921

Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15
1911	141.30	1915	65.85	1919	48.70
1912	121.60	1916	72.50	1920	36.26
1913	82.04	1917	72.23	1921	16.36

Average Monthly Price per Pound Since 1922

Months	1922 Cents	1923 Cents	1924 Cents	1925 Cents	1926 Cents	1927 Cents	1928 Cents	1929 Cents	1930 Cents
Jan.	18.82	32.73	25.86	36.71	79.50	38.75	40.25	20.14	15.24
Feb.	16.12	35.14	25.29	36.01	62.25	38.25	32.75	23.97	15.85
Mar.	14.53	34.21	22.83	41.00	59.00	41.04	26.82	24.55	15.34
Apr.	15.99	32.48	22.51	43.64	51.25	40.86	18.97	21.18	14.98
May	15.25	27.39	18.89	58.47	47.75	40.76	18.99	21.46	14.24
June	15.11	26.88	18.81	77.26	42.50	37.25	19.59	20.64	—
July	14.67	26.10	22.16	103.16	41.03	34.87	19.40	21.30	—
Aug.	13.93	28.84	26.17	82.99	38.50	35.12	19.46	20.59	—
Sept.	14.44	28.95	27.56	88.88	41.00	33.67	18.47	20.37	—
Oct.	19.78	26.93	31.13	98.01	42.50	34.32	18.83	19.67	—
Nov.	23.88	27.14	34.33	104.80	38.50	37.58	18.26	16.62	—
Dec.	27.42	26.60	37.88	98.51	38.25	40.63	17.97	16.12	—
Average for Year	17.50	29.45	26.20	72.46	48.50	37.72	22.48	20.55	—

London Closing Prices of Ribbed Smoked Sheet

(In Pence Per Pound)

Day	Mar.	Apr.	May	June	Day	Mar.	Apr.	May	June
1	7⅞	7⅝	7	—	17	7½	7½	6⅞	—
2	—	7⅝	7	6⅝	18	7½	—	—	—
3	7⅞	7⅝	7	6⅝	19	7½	—	6¾	—
4	7¾	7½	—	6⅝	20	7⅝	—	6⅞	—
5	7⅝	7½	6⅞	—	21	7⅝	—	6⅞	—
6	7½	—	6⅞	—	22	7⅝	7⅝	6⅞	—
7	7½	7½	6⅞	—	23	—	7⅝	6⅞	—
8	7⅝	7½	7	—	24	7⅝	7¼	7	—
9	—	7½	7⅛	—	25	7¾	7⅛	—	—
10	7⅝	7½	7⅛	—	26	7⅝	—	7	—
11	7½	7½	—	—	27	7⅝	—	6⅞	—
12	7½	7½	7	—	28	7¾	7	6⅞	—
13	7½	—	7	—	29	7¾	7	6⅞	—
14	7⅛	7½	7	—	30	—	7	6⅞	—
15	7⅝	7½	6⅞	—	31	7⅝	—	6¾	—
16	—	7½	6⅞	—					

Average Monthly Price Per Pound

Month	1928 Pence	1929 Pence	1930 Pence	Month	1928 Pence	1929 Pence	1930 Pence
Jan.	19.310	9.942	7.471	Aug.	9.300	10.505	—
Feb.	15.713	11.875	7.948	Sept.	8.530	10.160	—
Mar.	12.736	12.135	7.595	Oct.	8.807	9.620	—
Apr.	8.864	10.490	7.391	Nov.	8.596	8.442	—
May	8.845	10.717	6.926	Dec.	8.570	7.958	—
June	9.293	10.580	—	Average for Year	10.656	10.291	—
July	9.312	11.065	—				

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Day of Month	May	June	Day of Month	May	June	Day of Month	May	June
1	16.70	—	11	—	—	21	16.50	—
2	16.60	16.15	12	16.30	—	22	16:45	—
3	16.40	16.00	13	16.55	—	23	16.40	—
4	—	15.90	14	16.35	—	24	16.30	—
5	16.55	—	15	16.35	—	25	—	—
6	16.55	—	16	16.50	—	26	16.20	—
7	16.45	—	17	16.50	—	27	16.20	—
8	16.60	—	18	—	—	28	16.20	—
9	16.55	—	19	16.30	—	29	16.30	—
10	16.55	—	20	16.40	—	30	—	—
						31	—	—

Average Monthly Price Per Pound

Month	1928 Cents	1929 Cents	1930 Cents	Month	1928 Cents	1929 Cents	1930 Cents
Jan.	19.12	20.22	17.21	Aug.	19.28	18.62	—
Feb.	18.40	20.21	15.62	Sept.	18.67	18.83	—
Mar.	19.38	20.19	15.13	Oct.	19.62	18.46	—
Apr.	20.63	20.29	16.39	Nov.	19.84	17.53	—
May	21.58	19.41	16.43	Dec.	20.22	17.28	—
June	21.50	18.74	—	Average for Year	19.97	19.03	—
July	21.36	18.62	—				

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND			AFLOAT			ON HAND AND AFLOAT		
	1928	1929	1930	1928	1929	1930	1928	1929	1930
Jan.	110,244	76,342	126,068	46,441	93,330	65,483	156,685	169,672	191,551
Feb.	108,955	90,058	134,790	48,044	75,790	71,015	156,999	165,848	205,805
Mar.	114,061	100,536	141,843	43,378	76,648	63,646	157,439	177,184	205,489
Apr.	113,083	107,659	148,272	32,783	66,919	63,261	145,866	174,578	211,533
May	105,356	97,192		33,145	60,326		138,501	157,518	
June	90,198	92,061		38,392	58,748		128,590	150,809	
July	83,242	92,535		42,943	52,793		126,185	145,328	
Aug.	68,994	90,769		54,904	48,434		123,898	139,203	
Sept.	68,851	84,362		52,692	58,954		121,543	143,316	
Oct.	66,421	88,483		45,646	61,140		112,067	149,623	
Nov.	61,956	92,219		75,502	62,268		137,458	154,487	
Dec.	66,166	118,609		92,037	67,009		158,203	185,618	

(Rubber Manufacturers' Association figures raised to 100%.)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1928	1929	1930	At end of	1928	1929	1930
Jan.	66,524	25,191	60,434	July	35,429	30,080	
Feb.	62,964	25,554	64,557	Aug.	32,084	35,605	
Mar.	58,272	28,214		Sept.	31,440	42,188	
Apr.	53,425	31,368		Oct.	24,207	47,803	
May	44,628	31,290		Nov.	17,775	52,454	
June	38,756	31,025		Dec.	19,815	54,304	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1929					
December	53,431	53,180	53,894	54,260	
1930					
January	56,616	58,990	59,607	59,984	
February	60,460	61,482	62,659	62,725	
March	64,383	66,418	66,885	68,404	69,233
April	71,477	72,333	73,252	74,084	
May	75,540	76,118	76,932	76,953	77,198

Stocks in Liverpool

1929					
December	17,922	18,263	18,696	19,059	
1930					
January	19,433	19,640	19,515	20,063	——
February	19,898	19,761	19,677	19,704	
March	20,693	20,727	20,849	21,187	21,198
April	22,008	22,676	22,663	23,546	
May	23,877	23,755	24,448	24,722	25,526

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1928	1929	1930	End of	1928	1929	1930
Jan.	25,868	29,617	39,727	July	18,663	33,859	——
Feb.	22,867	32,373	44,371	Aug.	18,971	30,834	——
Mar.	20,539	29,437	45,657	Sept.	14,898	32,138	——
Apr.	16,946	26,474	48,473	Oct.	12,149	33,770	——
May	17,437	30,764	——	Nov.	29,188	30,963	——
June	18,207	30,403	——	Dec.	32,895	35,548	——

STOCKS IN OTHER CENTRES

1930 End of	Malaya Mainland	Afloat for Europe[1]	Holland	Colombo	Para and Manaos
Jan.	44,473	28,440	2,134	(2)	3,678
Feb.	41,111		2,159	(2)	4,370
Mar.	39,269		2,220	4,759	3,839
Apr.					4,382
May					
June					

(1) Reported by U. S. Department of Commerce.
(2) Not available.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total	Per Cent Balloons		Total	Per Cent Balloons
1922	16,297,735	0.0	1926	24,199,524	78.8
1923	23,140,620	0.6	1927	19,700,003	79.1
1924	21,863,311	19.7	1928	24,247,282	81.6
1925	26,001,664	66.8	1929	24,141,502	80.3
1929			1930		
July	1,896,666	78.2	January	1,601,326	84.0
August	1,570,099	79.4	February	1,653,421	78.9
September	2,110,003	80.7	March	2,061,999	79.1
October	1,647,350	76.4	April	2,339,834	81.1
November	596,989	64.7	May		
December	879,259	79.0	June		

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928	1929
Production	40,932	45,259	51,633	60,845	61,237	64,439	77,944	73,303
Shipments	39,987	45,204	50,120	59,262	59,002	64,059	74,296	74,021
Inventory[2]	6,132	5,772	7,427	8,142	10,456	10,264	13,624	12,627

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1928	1929	1930	1928	1929	1930	1928	1929	1930
Jan.	5,358	6,722	4,745	5,394	6,626	4,701	9,949	13,712	12,719
Feb.	6,363	6,912	4,859	5,031	5,282	4,474	11,721	15,495	13,238
Mar.	6,819	7,519	5,188	5,731	6,708	5,032	12,389	16,351	13,469
Apr.	6,178	7,884	——	5,812	7,294	——	12,717	16,929	——
May	6,759	8,145	——	6,457	7,184	——	13,024	17,849	——
June	6,692	7,304	——	7,117	7,254	——	12,162	17,957	——
July	6,498	6,475	——	7,895	7,855	——	11,157	15,830	——
Aug.	7,469	5,806	——	8,403	7,845	——	10,034	14,226	——
Sept.	6,802	4,758	——	7,145	5,998	——	9,765	12,875	——
Oct.	7,326	4,919	——	5,717	4,960	——	11,520	12,845	——
Nov.	6,075	3,603	——	4,998	3,558	——	12,579	12,935	——
Dec.	5,605	3,261	——	4,591	3,346	——	13,624	12,627	——

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1922	1923	1924	1925	1926	1927	1928	1929
Production	50,850	60,116	70,706	82,614	76,618	70,823	80,180	73,417
Shipments	49,673	59,072	68,016	81,004	71,591	72,896	77,127	75,298
Inventory[2]	7,643	8,425	11,052	11,313	16,200	13,692	16,117	13,660

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1928	1929	1930	1928	1929	1930	1928	1929	1930
Jan.	5,441	6,517	4,914	6,072	7,242	5,181	12,982	15,386	13,551
Feb.	6,895	6,769	4,943	5,431	5,278	4,627	14,650	16,999	13,905
Mar.	6,231	7,466	5,271	5,731	6,737	5,042	15,573	17,750	14,057
Apr.	6,661	7,634	——	5,702	7,164	——	16,638	18,134	——
May	7,168	7,660	——	6,300	7,038	——	17,702	18,928	——
June	6,953	6,978	——	7,136	6,950	——	17,159	17,741	——
July	6,674	6,178	——	8,729	8,113	——	14,974	16,332	——
Aug.	8,343	5,846	——	9,350	8,183	——	13,931	14,157	——
Sept.	7,103	5,536	——	7,154	6,250	——	13,543	13,424	——
Oct.	6,929	5,310	——	5,662	5,001	——	15,285	13,656	——
Nov.	5,592	3,780	——	5,002	3,712	——	15,743	13,701	——
Dec.	5,184	3,716	——	4,858	3,631	——	16,117	13,660	——

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% representative or complete when issued and that basis has been accepted when preparing the statistics in this table.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States			Canada			
	Total	Passenger Cars	Trucks	Total	Passenger Cars	Trucks	Grand Total
1923	4,020,255	3,631,728	388,527	146,488	129,228	17,210	4,166,693
1924	3,600,918	3,203,049	397,869	135,246	117,765	17,481	3,736,164
1925	4,265,704	3,760,459	505,245	161,389	139,311	22,078	4,427,093
1926	4,298,799	3,808,753	490,046	205,092	164,483	40,609	4,503,891
1927	3,393,887	2,938,868	455,019	179,426	146,870	32,556	3,573,313
1928							
July	390,445	337,933	52,512	25,226	20,122	5,104	415,671
Aug.	458,429	400,689	57,740	31,245	24,274	6,971	489,674
Sept.	413,722	358,872	54,850	21,193	16,572	4,621	434,915
Oct.	397,096	339,976	57,120	18,536	13,016	5,520	415,632
Nov.	256,936	217,256	39,680	11,769	8,154	3,615	268,705
Dec.	233,135	205,144	27,991	9,425	6,734	2,691	242,560
TOTAL	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929							
Jan.	402,154	350,617	51,537	21,501	17,164	4,337	423,655
Feb.	466,084	407,589	58,495	31,287	25,584	5,703	497,371
March	584,733	513,266	69,559	40,621	32,833	7,788	625,354
April	620,656	538,679	81,977	41,901	34,392	7,509	662,557
May	603,969	516,055	86,596	31,559	25,129	6,430	635,528
June	545,252	453,956	91,296	21,492	16,511	4,981	566,744
July	500,331	427,213	73,118	17,461	13,600	3,861	517,792
Aug.	499,629	444,711	54,918	14,214	11,037	3,177	513,843
Sept.	415,332	365,651	49,681	13,817	10,710	3,107	429,149
Oct.	380,011	321,195	58,816	14,523	8,975	5,548	394,534
Nov.	217,570	170,928	46,642	9,424	7,137	2,287	226,994
Dec.	119,950	92,717	27,233	5,495	4,426	1,069	125,445
TOTAL	5,358,361	4,603,609	754,752	263,295	207,498	55,797	5,621,656
1930							
Jan.	273,089	235,099	37,990	10,388	8,856	1,532	283,477
Feb.	323,962	276,833	47,129	15,548	13,021	2,527	339,510
March	401,378	336,178	64,200	20,730	17,165	3,565	422,108
April	442,630	375,171	67,459	24,257	20,872	3,385	466,887
May							
June							

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA								DUTCH EAST INDIES[1]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon[2]	India & Burma[3]	Sarawak[4]	British North Borneo[5]	Siam[6]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China[4]	Amazon Valley	All Other[4]	World Total[7]
1928	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,586	406,955
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,386
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	517,529
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,536
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,638	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1928:															
Mar.	27,879	10,508	17,371	3,683	775	645	581	269	3,999	5,825	9,690	700	2,750	1,211	47,499
Apr.	20,189	9,335	10,804	3,233	789	630	494	258	3,993	5,040	5,499	736	1,014	1,323	33,810
May	26,483	10,350	16,133	3,091	654	842	494	241	4,943	5,855	10,347	717	2,602	1,135	45,994
June	22,994	16,168	6,826	3,107	963	926	494	451	5,419	5,863	13,655	725	1,399	960	40,788
July	30,481	13,383	17,098	5,129	1,043	905	593	366	5,602	7,566	11,594	698	1,264	873	52,731
Aug.	35,674	15,114	20,560	5,720	398	1,227	593	544	5,668	7,438	11,893	712	1,732	450	56,986
Sept.	29,769	11,239	18,530	4,675	457	938	594	447	4,956	6,536	9,863	969	1,614	494	50,075
Oct.	24,476	12,603	11,873	3,999	864	949	564	457	5,295	7,474	10,124	513	1,399	732	44,243
Nov.	68,135	10,436	57,699	8,005	1,048	772	564	425	4,950	7,902	7,805	943	1,790	623	92,526
Dec.	66,763	11,122	55,641	7,848	1,113	744	565	294	5,120	8,792	10,896	948	2,220	588	94,769
1929:															
Jan.	52,546	13,415	39,131	8,301	1,864	873	600	461	5,640	8,067	11,076	850	2,134	643	79,439
Feb.	47,926	12,108	35,823	7,064	1,117	955	600	495	6,572	7,511	10,384	807	2,104	520	73,952
Mar.	49,448	14,553	34,895	6,583	1,413	758	601	499	5,515	6,620	10,629	658	2,332	786	71,189
Apr.	49,816	11,414	38,402	5,097	727	747	548	306	5,997	6,645	11,321	673	1,950	569	72,982
May	43,960	15,593	28,367	5,723	800	966	548	453	6,264	6,961	13,437	1,059	1,922	733	67,233
June	40,398	14,344	26,054	5,568	1,122	1,061	547	422	5,582	6,693	11,270	757	1,398	548	61,017
July	46,454	15,071	31,383	5,457	974	1,247	641	462	6,422	7,192	13,995	575	1,457	543	70,348
Aug.	50,441	15,469	34,972	6,079	685	993	641	431	4,644	7,298	10,782	1,032	1,563	499	69,619
Sept.	53,484	12,392	41,092	7,993	384	832	640	406	4,708	7,517	10,149	655	1,566	504	76,446
Oct.	47,937	12,516	35,421	8,381	812	1,047	671	485	4,697	8,295	10,512	893	1,606	445	73,265
Nov.	46,279	11,204	35,075	6,660	1,065	668	672	278	4,760	6,711	9,380	771	1,442	535	68,017
Dec.	46,147	15,018	31,129	8,683	900	930	672	320	5,189	8,279	11,102	966	1,674	443	70,287
1930:															
Jan.	52,535	11,773	40,762	7,741	1,560	791	600*	386	5,709	7,831	8,920	856	1,837	400*	77,393*
Feb.	48,947	12,960	35,987	7,825	1,245	847	600*	469	6,900	7,191	11,414	944	1,797	400*	75,619*
Mar.	47,320	13,236	34,084	6,269	1,129	976	600*	391	5,796	6,612	11,007	643	1,674	400*	
Apr.	43,813	14,627	29,186	5,030								435	1,201		

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927 and 1,437 in 1928. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included— such shipments were equivalent to 18 tons in 1923, 93 tons 1924, 6 tons 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons 1924, 2,239 tons 1925, 44 tons in 1926, 84 tons in 1927, and 1,459 tons in 1928. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands. This figure includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. *Figure is provisional; final figure will be shown immediately it becomes available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States[1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	236,977	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	342,378
1920	248,762	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	370,641
1921	179,678	42,087	15,135	21,920	8,124	21,718	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,562
1922	296,267	11,724	24,352	27,546	9,207	15,984	6,430	2,498	2,643	172	3,807	1,778	589	567	395,888
1923	300,372	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	408,018
1924	317,747	-11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	-807	3,178	944	1,370	414,847
1925	381,815	4,061	32,956	35,937	19,688	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	516,493
1926	395,667	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	613,643
1927	398,483	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	627,789
1928	404,496	4,846	36,498	37,855	30,447	25,621	12,482	15,134	8,438	7,958	2,243	4,418	3,178	3,138	596,695
1929	526,709	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	892,739
1928:															
Feb.	30,926	3,143	2,526	2,984	2,553	1,248	437	783	616	599	98	307	296	297	46,813
Mar.	36,893	3,179	1,902	3,521	2,989	1,694	763	231	918	816	95	351	497	398	54,247
April	35,663	—2,280	2,204	2,719	1,938	2,334	1,114	1,820	832	575	280	339	304	159	48,001
May	28,660	—5,322	3,297	2,944	2,180	2,288	1,090	3,893	655	746	209	485	220	213	41,558
June	25,143	—3,031	3,597	2,968	2,186	2,102	984	4,111	348	743	133	346	251	182	40,068
July	28,170	—1,374	3,518	3,387	2,692	2,026	1,598	724	591	895	395	294	175	384	43,475
Aug.	28,827	48	3,527	2,744	2,447	1,868	875	632	707	519	316	359	58	94	43,021
Sept.	36,800	4,199	3,524	3,553	2,812	1,837	1,278	20	603	597	345	377	277	235	56,457
Oct.	41,667	—934	3,728	4,386	2,943	3,711	1,049	98	766	696	141	527	250	318	59,346
Nov.	33,846	—3,141	3,278	3,694	2,799	2,150	1,340	689	827	544	31	337	252	232	46,988
Dec.	40,781	8,438	3,633	2,470	2,618	3,002	1,145	1,378	755	639	148	435	263	209	65,905
1929:															
Jan.	53,922	11,951	5,645	4,711	3,759	3,776	1,481	956	1,061	749	218	638	179	525	89,571
Feb.	41,331	5,179	5,001	4,618	2,908	2,727	1,259	684	1,131	627	113	226	115	356	86,270
Mar.	46,391	9,068	4,409	4,586	4,961	2,630	1,515	716	725	931	316	354	80	409	77,091
Apr.	52,447	8,295	4,854	5,351	3,177	2,308	1,407	703	1,518	750	144	956	40	445	82,395
May	48,350	5,112	3,152	3,682	2,937	2,314	1,417	996	1,437	854	201	468	37	277	71,234
June	38,676	4,787	6,814	3,948	3,075	1,593	1,624	695	2,215	672	687	507	24	420	65,787
July	40,914	4,993	4,839	3,559	3,205	2,388	2,023	1,056	2,918	1,039	253	519	30	465	68,201
Aug.	35,207	14,594	4,645	4,082	2,879	3,663	908	1,234	724	902	254	429	25	319	69,865
Sept.	32,171	17,010	3,889*	4,691	1,908	3,511	1,224	1,235	853	672	253	361	91	477	68,346
Oct.	35,840	16,111	4,489	3,355	1,821	3,902	1,838	1,073	1,125	1,147	278	710	91	201	71,981
Nov.	40,972	13,141	3,082	3,776	2,709	3,221	1,275	1,226	1,453	361	253	595	62	313	72,439
Dec.	40,488	12,434	4,274	2,921	2,114	2,251	1,198	1,200	726	741	52	677	90	443	69,609*
1930:															
Jan.	44,759	11,106	4,207	3,862	2,842	2,805	910	1,000*	332	612	209	552		577	
Feb.	40,718	10,293	4,482	3,697	2,250	1,386	1,385		457	1,143	188	315		239	
Mar.	42,068	12,346		4,289	3,776		1,083		975						

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]United States imports of guayule are not included in this compilation; such imports amounted to 4,305 tons in 1926; to 5,010 tons in 1927; to 3,076 in 1928; and to 1,231 tons in 1929. *Figure is provisional; final figure will be shown immediately it becomes available.

Domestic Production of Miscellaneous Rubber Goods

	Rubber Proofed Fabrics Yards	Rubber Heels Pairs	Rubber Soles Pairs	Mechanical Goods Shipments Dollars
1924	25,020,000	186,279,000	(1)	$48,615,000
1925	23,988,000	206,970,000	16,211,620(2)	64,877,000
1926	29,328,000	183,312,000	12,258,000	76,789,000
1927	37,872,000	201,014,000	27,160,000	68,625,000
1928	41,179,000	235,170,000	37,645,000	69,114,000
1929	50,731,000	232,126,000	34,499,000	74,770,000
1929:				
April	4,000,000	17,256,000	2,601,000	7,035,000
May	4,860,000	19,541,000	2,916,000	7,189,000
June	4,409,000	20,007,000	2,502,000	6,792,000
July	4,260,000	19,315,000	1,295,000	6,306,000
August	5,085,000	23,095,000	2,948,000	6,792,000
September	5,507,000	21,702,000	2,841,000	5,906,000
October	6,116,000	22,386,000	3,502,000	5,887,000
November	4,395,000	17,863,000	3,400,000	4,932,000
December	2,291,000	14,781,000	3,003,000	4,751,000
1930:				
January	3,281,000	15,470,000	3,496,000	5,169,000
February	3,441,000	14,172,000	2,338,000	5,376,000

(1) Not available; (2) Last 9 months only.
Source: "Survey of Current of Business of the Department of Commerce."

United States Imports of Guayule Rubber and Related Gums

(All quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Gutta Percha Tons	Gutta Percha Dollars
1919	1,430	760,690	727	987,088	8,832	2,213,964	2,900	1,068,698
1920	758	845,985	1,064	1,260,043	5,672	2,068,501	3,183	1,520,309
1921	58	26,945	814	1,077,559	1,745	851,893	955	333,564
1922	127	57,040	812	978,765	2,235	403,812	818	281,012
1923	1,155	542,227	700	898,524	4,565	853,308	912	375,167
1924	1,356	536,392	464	568,456	6,165	1,237,100	1,408	463,610
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	1,603	629,284
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	1,445	661,156
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,494	728,172
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	1,597	777,128
1929	1,231	545,175	728	566,964	8,203	2,458,126	447	167,479
1929:								
July	200	86,175	49	46,440	572	180,065	14	5,807
Aug	190	80,443	58	47,769	575	171,783	—	—
Sept.	107	51,156	38	30,827	913	279,225	—	—
Oct.	200	79,968	58	43,756	636	181,421	—	—
Nov.	125	47,796	13	11,600	583	182,677	49	14,935
Dec.	100	41,328	25	19,955	550	156,939	51	12,095
1930:								
Jan.	150	55,272	28	28,549	509	141,384	—	—
Feb.	75	25,956	52	45,319	367	93,087	—	—
Mar.	148	50,007	16	12,498	522	128,844	—	—
Apr.	75	19,856	58	54,548	410	103,089	—	—

Reclaimed Rubber in the United States

(All Quantities in Long Tons—100% Basis)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks*	Year	Production	Consumption Tons	Consumption % to Crude	Stocks*
1920	96,395	75,297	28.4	.....	1925	132,930	137,105	35.6	13,203
1921	36,725	41,351	24.1	.....	1926	180,582	164,500	45.9	23,218
1922	57,334	54,458	19.8	.....	1927	189,144	178,471	47.6	24,980
1923	74,766	69,534	22.7	.....	1928	208,516	223,000	50.4	24,785
1924	80,079	76,072	22.4	.....	1929	218,954	226,588	48.4	27,464
1928:									
Jan.	14,862	20,140	58.5	21,941	July	17,278	19,070	51.0	17,305
Feb.	15,291	18,670	55.4	20,843	Aug.	19,049	17,890	41.7	15,881
Mar.	17,069	20,680	57.9	19,558	Sept.	18,693	17,795	44.6	17,991
Apr.	15,393	19,280	58.8	19,283	Oct.	17,182	18,420	45.1	17,026
May	18,945	20,215	54.1	18,187	Nov.	18,245	18,380	49.1	22,899
June	18,781	18,140	48.2	18,709	Dec.	17,728	14,320	45.9	24,785
1929:									
Jan.	18,685	21,068	49.1	24,394	July	18,387	20,236	48.7	19,679
Feb.	18,094	19,829	47.7	23,305	Aug.	19,787	18,230	47.6	22,309
Mar.	19,954	20,867	46.7	22,076	Sept.	18,660	17,071	49.2	24,984
Apr.	19,899	22,435	47.3	20,680	Oct.	18,865	18,744	53.8	25,117
May	20,285	23,176	47.1	19,479	Nov.	14,363	15,330	55.4	26,080
June	18,416	18,141	42.0	17,980	Dec.	13,429	11,521	49.0	27,464
1930:									
Jan.	15,010	17,454	47.6	24,241	July	.....	.....	.....	.....
Feb.	15,846	14,559	44.5	24,243	Aug.	.....	.....	.....	.....
Mar.	17,400	15,241	42.2	24,415	Sept.	.....	.....	.....	.....
Apr.	17,828	16,904	42.0	24,587	Oct.	.....	.....	.....	.....
May	.....	.....	.....	.....	Nov.	.....	.....	.....	.....
June	.....	.....	.....	.....	Dec.	.....	.....	.....	.....

*Stocks on hand at the end of month or year. Exports of reclaimed rubber, not shown in this table, amounted to 8,540 tons in 1927, 9,577 tons in 1928, and 12,869 tons in 1929.

U. S. Consumption of Gasoline

(In Barrels of 42 Gallons)

MONTHS	1929	1930	MONTHS	1929	1930
January	22,602,000	25,731,000	July	36,860,000	
February	22,776,000	26,508,000	August	37,759,000	
March	28,495,000	31,029,000	September	34,193,000	
April	32,019,000	34,549,000	October	32,816,000	
May	34,117,000		November	31,502,000	
June	39,163,000		December	26,550,000	

REVIEW DESK

Books, New Publications, Catalogues, Etc.

ANNUAIRE TECHNIQUE DU CAOUTCHOUC. Edited by A.-D. Cillard. Published by *Le Caoutchouc et la Gutta-Percha*, 49 Rue des Vinaigriers, Paris, France. 1930. 288 pp. 47 francs.

The rubber world has been in need of an adequate annual directory for some time, but this volume falls short of filling that need, chiefly because of its limitations of territory. The first of its three sections contains a listing of all French suppliers of materials and mechanical equipment, arranged under 400 classifications. In its second division is an attempt to list so far as possible the rubber manufacturers of the world, classified by countries. On the basis of its list of American factories, it can not be termed a completely up-to-date index of actual rubber manufacturing plants. The final part is a 52-page glossary of chemicals and compounding materials, prepared by Dr. A. D. Luttringer.

PROTECTIVE RUBBER LINING AND COVERING FOR INDUSTRY. Published by the Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., Passaic, N. J. 1930. 24 pp. For free distribution.

Corrosion, if unchecked, eats into equipment and profits and becomes one of the most destructive elements in modern industry. Rubber covered metal equipment has in recent years had a rapid growth of appreciation for its efficiency in handling active acids, alkalies, salts and other corrosive solutions. The company which has prepared this pamphlet has been successfully rubber lining and covering tanks, drums, pipes and other articles for the chemical and allied industries over a period of 30 years.

THE BLACK ART OF RUBBER COMPOUNDING. Chat No. 17. Velvetex. Published by the Binney & Smith Company, 41 East 42nd Street, New York City. 1930. 14 pp. For free distribution.

A description of the composition of Velvetex carbon black, an analysis of the physical properties of Velvetex rubber stocks, and comparative microphotographs of Velvetex, zinc oxide, whiting and China clay are included in this booklet. Velvetex, according to its manufacturers, is the softest form of carbon black available and is termed by them "the economical diluent for rubber."

COOPERATIVE MARKETING ACTIVITIES IN BUSINESS. Published by the Policyholders Service Bureau, Metropolitan Life Insurance Company, 1 Madison Avenue, New York City. 1930. 30 pp. For free distribution.

Group marketing enterprises to reduce distribution expense have become more common in industry in recent years. This report is made up of brief case studies of such group activities by competing manufacturers, by non-competing manufacturers, and by retailers. The nearest that rubber manufacturers in this country have come to such co-operative effort was in the brief advertising campaign of the short-lived Rubber Institute, and it would be well, therefore, if the leaders of the rubber trade could study and digest the work done toward this end in other domestic industries.

THE FUTURE OF RUBBER. By Lt.-Colonel J. C. G. Kunhardt. Published by the Rubber Shareholders' Section, Institution of the Rubber Industry, 10 Charing Cross, London, England. 1930. 38 pp. 2s 6d.

The author has tackled the rubber situation from a rather novel angle, the main centre of his arguments being concerned with the probable depreciation of the existing mature areas. For various reasons this aspect of the situation has not so far been given the consideration it deserves, but it is significant that deterioration of old rubber is already becoming a serious problem in the Dutch East Indies and other districts where restriction of output has not been practiced. The writer's contention is that large tracts of rubber will go out of existence from now on, and, without being dogmatic on the point, he submits estimates which indicate that consumption before long will overtake production, and he contends that the price of the commodity, as a result, must rise considerably during the next few years. He figures that the world's normal consumptive capacity at 10 per cent annual increases will exceed the world's normal productive capacity in 1930 by 41,750 tons and by greater amounts yearly until 1935, when consumption will be 505,854 tons higher than production. The author's conclusions will make interesting reading for rubber plantation shareholders.